DEPARTMENT OF AGRICULTURE
VICTORIA

P. J. Moors

Richard T. M. Scott
1926.

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2 Large folding plans
of basement House
Domain Gardens $95

Department of Lands and Agriculture, Victoria.

REPORT

OF THE

SECRETARY FOR AGRICULTURE;

TO WHICH IS APPENDED THE

REPORT OF THE INSPECTOR-GENERAL OF GARDENS PARKS, AND RESERVES.

MELBOURNE:
BY AUTHORITY: JOHN FERRES, GOVERNMENT PRINTER.

MDCCCLXXIII.

PREFACE.

THE constitution of the Department of Agriculture will be best understood by a brief account of the institutions somewhat similar which preceded it, and the abolition of which led to its establishment. The first agriculturists' association established in Victoria was known as the Port Phillip Farmers' Society. It was started in 1848, and, after a mingled career of prosperity and misfortune, practically died out in 1867, though it was not until June 1870, that a meeting of the society was held for the purpose of vesting the balance of the funds then on hand in trustees, to be handed over to any new agricultural society, founded on a national basis, and subject to the approval of the said trustees. During the years from 1854 to 1857, the above-named society was in a highly flourishing condition, and at that time undertook to establish branch societies in different parts of the colony, viz., in the county of Mornington, at Bacchus Marsh, Gisborne, &c. These branch societies separated ultimately from the parent institution, which, being left without a sufficient district to represent, dwindled gradually, and in the above-named year became extinct.

The leading members of the committee of the Port Phillip Farmers' Society advocated and were instrumental in creating the Board of Agriculture, which was established by the Act 22 Vict. No. 83, and held its first meeting on the 20th July 1859. The Board it was thought would be the means of ventilating all matters appertaining to agriculture and the farming interest, and from its labours much was expected. Unhappily however, the Board fell into the fatal error of thinking that the best way in which to promote the interests of agriculture was to distribute among the societies the whole of the grant in aid, excepting such portion as was required to defray the expenses of the Council and to meet the salaries of the secretary and messenger; and thus it was rendered unable, for the want of funds, to initiate or carry out

any project calculated to promote that important interest. This short-sighted policy led, as might have been anticipated, to the downfall of an institution which, under judicious management, might have been rendered productive of great benefit to the community. And it is much to be regretted that the baneful course adopted by the Board of Agriculture still finds favour with the societies.

After the abolition of the Board, a strong feeling was evinced by the public for the establishment of a Department that would constitute the highest authority on agriculture generally, and to which all matters appertaining to that interest should be referred. This feeling was gratified by the present (Francis) Administration creating a Department of Agriculture, and on the 19th June 1872 the Honorable J. J. Casey was appointed first Minister of Agriculture.

Though the foundation of the Department may be said to date from the appointment of the Minister, some time elapsed before the office of secretary was filled up*; and as in the organisation of a new Department many difficulties have to be overcome, it will be doubtless apparent that little time can remain for the preparation of a detail report of its proceedings. Hence this first report is not so complete as could have been desired, nor indeed so instructive as it is hoped in future to make the reports of this Department.

A. R. WALLIS,
Secretary for Agriculture.

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* Full particulars of the manner in which this appointment was made will be found at page 251.

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REPORT.

TO THE HONORABLE JAMES JOSEPH CASEY, M.P., MINISTER OF LANDS AND AGRICULTURE, ETC., ETC., ETC.

Department of Agriculture, Melbourne,
1st June 1873.

SIR,

I do myself the honor to submit for your consideration my first Report upon the proceedings of this department. In doing so, I have deemed it not inappropriate to place on record the date of my taking office, together with brief particulars of the difficulties, which beset my path in the beginning. When I entered upon the responsibilities of my office, on the 15th of November 1872, I found it somewhat difficult to launch at once into the duties of my position, owing to want of office accommodation. In fact, what with the delay occasioned by this circumstance, and the cessation from work, caused by the intervention of the Christmas vacation, it may be said that the department had no real existence until after the commencement of the new year.

The first duty undertaken was the drafting of regulations (*see* Appendix R.) under which the sums, voted by the Legislature in aid of the funds of Agricultural Societies, for the encouragement of the growth of flax, and for the production of sugar from beet-root, should be made available. The vote to Agricultural Societies has since been distributed, excepting a balance of £298 19s. 6d., which could not be apportioned under the above-mentioned regulations. Steps have been taken, in accordance with the wishes of those who purpose undertaking its growth, to obtain from Europe a quantity of the best known varieties of flax seed ; but the season for sowing

the crop not having yet arrived, the balance of the grant is still unappropriated, and will require to be re-voted. The sum (£5000) to be given as a bonus to the person or company who shall produce the first 500 tons of sugar from beet-root grown in Victoria, is still unclaimed.

The necessity for amalgamating the small societies in certain agricultural districts, has suggested the propriety of appropriating, for the attainment of that object, the balance of the grant to Agricultural Societies under an additional regulation. And I am able to report that my communications with the societies in question have thus far elicited favorable replies, and that there is reason to anticipate that the terms of union will be shortly agreed upon.

Communications have been addressed to the department by the Ballarat Farmers' Club, relative to the appointment of local agricultural boards, whose duty it shall be to work hand in hand with the department for the sole object of promoting Victorian agriculture. Of their usefulness, and of the desirability of making such appointments, there can be no doubt, it being a *sine qua non*, that only practical agriculturists shall be eligible for election. But in order to carry out this project it will be necessary to augment the staff of the Agricultural department. Much useful work could be entrusted to such local bodies; amongst other things the collection of Agricultural Statistics.

It is proposed in the ensuing financial year, should Parliament be pleased to increase the grant in aid, to offer prizes for the best managed farm in each agricultural district. The necessity for instructing agriculturists by practical example in improved systems of farm management, is universally acknowledged; and the system adopted with so much success in connection with the Highland Society of Scotland and the Royal Agricultural Society of England will be likely also to prove the most beneficial here.

The great importance of technical education, particularly in agriculture and its allied sciences, is daily being more widely felt. Germany led the way and set an example to the world, and she has since been imitated by England and other countries. But in no country has agricultural education received so much attention

of late years as in America. The ever increasing settlement on the land, and the daily growing demand for a knowledge of the principles of farm management, pointed to the necessity of founding schools of agriculture throughout the length and breadth of that country. The part which these schools, or, to use the more proper word, universities play in the education of the American people, and the beneficial influence which they exercise upon the production and welfare of the country, come scarcely within the limits of calculation. The same cause, viz., the increasing settlement on the land and the growing demand for a knowledge of the principles of farm management on the part of the occupants, is rapidly spreading in Victoria; and I would therefore strongly urge the necessity for reserving, in parts of the colony to be hereafter decided upon, lands for the endowment of future schools of Agriculture.

Authority has been obtained from the Honorable the Chief Secretary for the transfer of the library and other property of the late Board of Agriculture to this department; but it having been found impossible to make room for their reception, the Trustees of the Public Library have kindly consented to retain the charge of them for the present. In connection with this branch of my department, I have to acknowledge the donation from Mr. Frederick Watts, Commissioner of Agriculture in the United States of America, through the American Consul in this city, of a complete series of the Reports of the Agricultural department of that country. I have to acknowledge the presentation, on the part of the Rev. J. I. Bleasdale, D.D., of his valuable pamphlets on the wine industry of this country, and meat preserving by Mr. James Harrison's freezing process; and also, on the part of Mr. Charles French, of Dr. Masters' Catalogue of Australian Coleoptera. The importance of works of reference in Agriculture is so considerable, and access to such would be so great a boon to our farming community, that I venture to suggest the propriety of throwing open the departmental library to the public. This would necessitate the erection or acquisition of increased accommodation, and the appointment of an attendant to take charge thereof; but to render the library accumulative it would be necessary to ask Parliament to vote a

small sum annually, say £50, for the purchase of the leading agricultural journals of other countries, and of new and important works on agriculture and its allied sciences. To the library might be added, in due course, a museum, in which should be displayed all matters appertaining to agriculture and agricultural science, including soils from different parts of Victoria, together with a chemical analysis of the same, and a brief account of the geological features of the different rocks, from the decomposition or disintegration of which they have been formed, the insects injurious to the crops of the farmer, and other subjects bearing on the economy of production.

My tour through the Goulburn Valley (*see* Appendix H) revealed the existence of an extensive tract of fertile land, previously but little known to the farming community; and the brief account subsequently supplied to the public prints has been the means of diverting to some, perhaps a considerable extent, the flow of settlement in that direction. The land in that district, though fertile, is not adapted to a very wide range of British grown crops. For wheat, perhaps, it will not be surpassed by any other district of the colony, but for the succulent crops—turnips, mangolds, &c., we have many districts superior to it.

Flax culture, it has been decided by Parliament, is to receive one more trial. This crop was much grown some years back in the Bellarine district, but was abandoned, as it could not be produced profitably. A few farmers, in various parts of the country, have, however, continued to plant small patches at intervals since that time, and the prevailing opinion now is that the crop can be profitably cultivated. Certainly, circumstances have changed since the days when flax was grown in the neighborhood of Geelong. The smaller descriptions of twine are now made in the colony, and the manufacture of cornsacks will shortly be commenced, all which circumstances tend to elevate the industry of flax culture. But perhaps the greatest boon to proposed growers, the one which will be most appreciated by them, as it will so materially reduce the cost of production, is the late invention, by one of our leading agricultural implement firms, of a machine for breaking and scutching.

The want of a substitute for hand labor has marred previous attempts to bring fibre profitably into the market. Now that this obstacle is removed, and the demand for this staple will increase with the augmentation of the manufacture of fibrous wares, it is possible that flax may be grown profitably, though it probably will never be a highly remunerative crop in this country. The reintroduction of the flax industry has necessitated the publication of a paper on the culture and after-treatment of that crop, which paper will be found in another part of this Report. (*See* Appendix G.)

The daily increase of stock-breeding on farms has suggested a paper on that subject. (*See* Appendix A.) The necessity for the introduction of live stock, more particularly sheep, on farms has long been advocated by experienced persons, and by the agricultural press, but it is only lately that the subject has received much attention at the hands of our cultivators. The beneficial action of stock as a restorer of fertility to the land is too generally known to call forth detailed remarks; and as one season follows in its turn another, so is this fact being gradually revealed to our farmers. The advent of stock-breeding on farms forms a new era in the annals of colonial agriculture; and the increased price of wool, and the daily improvements made in the processes of conveying animal food to Europe, is likely to render this improved system of management highly profitable.

The increased prevalence of fluke during the past two seasons has been the cause of serious loss in some districts of the colony. The spread of this disease is attributable to the excessive humidity of the spring months, and to the travelling of sheep from unsound to previously healthy country. When a sheep is once badly infected with flukes it is perhaps impossible to wholly rid the animal of them; still the disease may be kept in check. The best preventive is to at once remove affected stock to salt-bush country; but the disorder may likewise be stayed by the administration of common salt and sulphate of iron, mixed in the proportion of four parts by weight of salt to one of iron. As land becomes improved by thorough drainage, so in turn does fluke diminish. This fact has been most satisfactorily proved in England, since the surface land of that

country has been laid dry by underground tiled channels. The necessity for taking some steps to stay the spread of this most fatal disorder cannot be too strongly urged. Further remarks on this subject are given in another part of this Report. (*See* Appendix F.)

The ravages caused by locust swarms during the past season, and the number of eggs which these creatures have deposited in the ground, furnish sufficient grounds for fear, that a re-occurrence of the plague will be experienced in the coming season. The damage done by these insects is very considerable. Complaints have not unfrequently been made that they destroy all that comes before them, trampling under foot that which they do not consume, and so seriously affecting the pasturage with their excrement that sheep do not like to feed after them. Domestic poultry and even pigs consume them in great numbers, and many of our native birds—notably the magpie and laughing jackass—devour large quantities. The absolute necessity of strictly preserving all insect-eating birds in this country, where the plagues of the locust and caterpillar are of so frequent occurrence, and where insect blights are yearly becoming more prevalent, is hereby demonstrated. But our native birds, domestic poultry, pigs, and all other animals, which devour these creatures, are not sufficient to materially lessen the plague. Some more wholesale manner of combating this nuisance must be discovered before we shall be able to rid ourselves of the plague. If some practicable means of destroying the eggs deposited in the ground could be devised, this end might be obtained. Such results, however, are gained after long and carefully conducted experiments, and are seldom hit upon by chance; hence the necessity for some person to investigate and study our insect plagues, with a view to discover means for lessening the same. I have been favored by Mr. Thos. Bath, of Ceres, with some notes on observations, made by him during the late locust visitation, as it presented itself in the Learmonth district; also with careful drawings, made for him by Miss M. Gatliff, of Ballarat, of the insect, and of a species of Ichneumon fly which, as his observations, and those also of other people, go to prove, preys upon

and so tends to destroy the locust. I am indebted to Professor McCoy, Professor of Natural Science in the University of Melbourne, for notes on these insects, and to Mr. Howitz for having made carefully enlarged drawings of them, which have enabled me to have the insects reproduced by photo-lithography at a minimum expenditure. The above-mentioned notes, with plates of the insects, are given in another part of this Report. (*See* Appendix C.)

The increasing scarcity of timber, and the difficulty of procuring suitable wood for fencing, has called forth a paper on hedge plants adapted to Victoria. (*See* Appendix D.) This want of timber is not confined to the older districts. Our newly settled areas, the Goulburn district for example, are similarly situated; and should farmers within the next few years require to renew their fences, no timber will be obtainable, unless carted an average of twenty-five to thirty miles from the ranges, or other wooded country. Hence, the necessity for farmers planting live fences (which, when once established, will renew themselves) while the posts and rails are still standing to protect them in their early growth against damage by stock. By planting the cultivation paddocks first, and so continuing to put in live fences as new land is broken up, farmers might replace their posts and rails by quick or some other suitable plant, without fear of damage by stock during its early development.

The importance of State aid in agriculture, in every young country, where it is daily sought to establish new industries, and to open up markets for produce, and thereby to add to the wealth and prosperity of such country, suggests the propriety of making provision on the Estimates for the service of the year 1873-4 of a grant for holding a show of live stock, farm produce, and farm implements in some large provincial centre of production, to be hereafter decided upon. The beneficial influence which such exhibitions, if held annually, would exercise on production and improvement in agricultural implements and machinery, would doubtless be considerable. What has been effected by similar institutions in other countries, notably in England by the Royal Agricultural Society; in Scotland by the Highland and Agricultural Society; in Ireland by the Royal Irish Society, and in

countries on the European continent as well as in America, is so generally known as to render a detailed account unnecessary in this place. It is proposed, in holding these shows, to follow the example set by one or other of the above-named countries as a type, but to modify or add to the same as local circumstances demand. The main feature of such exhibitions should be the making a specialty, in each successive year, of some one class of labor-saving machines, giving always twelve months' notice of the class of implement or machine which, at the next following show, would have to compete in the special class. The prize in such class should be of sufficient importance to stimulate rivalry in invention. The implements or machines competing should be publicly tried, and the awards left in the hands of known competent judges, who should issue a detailed report of each machine, stating the advantages, in their judgment, possessed by the one over the other, and furnishing their reasons for having so awarded the prizes. Special prizes for stock and for farm produce might also be offered, such produce representing a fair average of a given quantity, which should at all times be open to inspection by the judges, should they be disposed to satisfy themselves as to its existence. The object of such a course would be obviously to insure that the quantity of the produce was sufficiently large to remove all doubts of its being a fanciful production, obtained at a cost of labor that would never return a profit.

I have been favored by the Rev. J. I. Bleasdale, D.D., with his lately prepared pamphlet on colonial wines, carefully revised and copiously amplified for the purposes of this publication. (*See* Appendix M.) The importance of the wine industry in this country, both as a source of national wealth and as a promoter of domestic comforts and happiness, cannot well be over-estimated; and it is to be regretted that the enterprise and industry of our vignerons should have been marred by the prejudices common to British people. But it is encouraging to witness the gradual reform which the wine shops are effecting. The British laborer and artisan, animated, no doubt, by the example of his Continental brethren, is learning by degrees to appreciate the boon which these

institutions confer upon him, and the time is probably not far distant when he will cast aside beer for that more refreshing, and, in this climate, more wholesome beverage—colonial wine. The change is noticeable likewise in other quarters. The wealthier classes, who, but a short time since, would have shuddered at the very term "colonial wine," now place our pure native wines upon their own tables; and the practice is gradually increasing with the improvements that are taking place in the manufacture of the wine. These circumstances all tend to elevate the condition of our wine industry, and it is to be hoped that the enterprise of our vignerons will shortly reap its just reward. Dr. Bleasdale's pamphlet gives a complete history of wine-growing in this country, and contains valuable tables giving the average alcoholic strength and other information, relative to wines grown in the different districts of Victoria, as well as many localities of New South Wales and South and Western Australia.

I have been favored by the same gentleman with his essay on preserved meats (*see* Appendix B), having reference principally to Mr. James Harrison's freezing process, and containing the results of further and still more interesting and conclusive experiments. This new process of conveying fresh animal food to England, which will shortly receive practical test, promises an entirely new future for the agriculture of this colony. The necessity of introducing the breeding and feeding of live stock into our colonial farm system, is daily being more generally acknowledged, and if, to the profits arising from the sale of the wool, the disposal of the carcase to the boiling-down establishments, and the renovation of the soil, can be added, the gain which must attend the success of this new process, a prosperous future awaits our farmers.

The desirability of instituting an enquiry into the composition of our old and worn-out agricultural lands with a view to discover what elements of fertility have been exhausted, and to suggest means by which these may be restored, indicates the necessity of appointing in connection with the department a chemist of known ability. That which but a few years since was fertile country, pouring its large yields into our markets, is now a comparatively barren waste, so poor

that our farmers are fast deserting it and seeking new homes. The absolute loss which this systematic exhaustion of the soil will bring upon the country, as a whole, is perhaps inestimable, but the distress, probably ruin, which its continuance will occasion, requires not a prophet to fortell. There is a wide difference between chemical research and routine analysis. The former demands the attention of an accomplished chemist, whereas the latter may be entrusted to a mere assistant. It is the former which we require in agriculture, the latter is of little avail.

A few weeks since much consternation was created in the public mind by the sudden deaths occurring amongst stock in various parts of the colony. These deaths, on investigation, were found to be due to the presence in our pastures, and in unusually large quantities, of two species of poisonous plants, the one the Lobelia pratoides, the other the Solanum nigrum. Both these species are widely spread, and can be found in abundance every season; the former more generally on moist lands, whereas the latter adapts itself, with greater or less facility, to all classes of soil. They both contain an active poisonous principle; but their deleterious effects on the health of stock have been greatly over-rated. The deaths resulting from the grazing on these plants can, in every instance, be satisfactorily traced to gross mismanagement and over-stocking. Taken in moderation along with other herbage, they do no harm, but if, from necessity or lack of other food, cattle are compelled to consume them in quantity, death results. To give proof of the harmlessness of the Solanum nigrum, it is necessary only to mention that the ripe berries of the plant are used as an article of human food in our country districts, and that children eat them with impunity. But it is proper also to observe that the unripe green berries contain the poisonous principle far more strongly developed than the ripe black ones. With judicious management our stockowners have nothing to fear from these plants. The reports of the Government Botanist, the Stock Inspectors, &c., together with wood-cuts of the plants in question, are given in another part of this Report. (*See* Appendix K.)

Though the country has by no means enjoyed an immunity from the Oïdium, still we have heard much less of the damage done by that disease than once was anticipated. This comparatively favorable result is probably due to the past season not having been in all respects the most favorable to the growth of this fungus. Of the remedial substances applied in the cure of this disorder, the most simple—the application of sulphur—is perhaps the most efficacious. There seems to be but little doubt that sulphur, applied early in spring and at intervals through the season, acts as a destroyer of this fungoid growth. For full particulars *see* Appendix E.

Considerable pains have been taken to collect, from the records of the late Board of Agriculture and from the reports transmitted by the Agent-General, full particulars relative to the wines shown at the Board's exhibition, held at Melbourne in August 1870, and subsequently forwarded to the Agent-General for examination and report by competent European authorities. (*See* Appendix N.) The information has been published in a concise tabular form, by reference to which it may be seen what tests each wine has undergone, and what, in the opinion of the judges, are its merits compared with those of any one of the other samples. It will be observed that no report has yet been made of some of the wines transmitted to Europe for examination. This may be accounted for by the following facts. The wines when landed were all carefully cellared in the Docks for a period of some months, after which time they were examined, and all those that were thought to have sufficiently recovered from the effects of the sea voyage were then sent to Germany and France for examination by committees of the most experienced wine tasters; the remainder being left for subsequent examination. Of some wines only one bottle, and of others again only two, were forwarded to the Agent-General, which circumstance will account for the irregularity in the number of the reports made upon the different samples. Again, many bottles were badly corked and thus useless, others were broken when received, while others never reached their destination, having been either lost or stolen on board ship. Since the above-mentioned reports have come to hand intelligence has reached us, by wire, of the further

examination of six samples of Victorian wine by European experts. These, it is stated, compared with French and German wines of a similar class, have been pronounced of a high standard and excellent quality; but it has not yet transpired to whom the samples belong. The telegram further states that a commercial demand for Victorian wines is anticipated.

The papers respecting the Phylloxera vastatrix, or new vine scourge (*see* Appendix L), received from the Imperial Government by the March mail, have already been issued and distributed in pamphlet form. However, owing to the need for circulating the information with the least practicable delay, and to the fact of the greater half of these papers having been received in the original French, time did not permit of the whole being rendered in English prior to the publication of the above-mentioned pamphlet; consequently the report of the commission, appointed to enquire into this new disease, only was translated. But as this contains substantially the whole of the information embodied in the other communications, it was deemed unnecessary to delay the publication of the papers awaiting their translation. These, however, have since been rendered in English, and the translations are given in lieu of the original French in this report.

Caterpillars, though not so widely dispersed as in some years, have not been altogether unobserved during the past season. Complaints of the damage done by these insects have come from Gippsland and various parts of the Western district. The havoc which they occasion, and the desolation which they cause to our ripening crops, are generally known, and again point to the necessity of having some person engaged in the investigation of our insect plagues. A gentleman, who witnessed the hordes of caterpillars in the Western district, likened them to a mighty army marching onwards and laying waste everything that came before it.

Although the Agricultural Statistics are not collected by this department, I deem it not inappropriate to record the satisfactory increase of the lately garnered harvest. With the exception of the decline in the yield of oats, and in the production of wine in 1871, no crops of importance show a decrease compared with the returns

of the previous year; while wheat, the most important of all, shows an increase of 890,309 bushels, and potatoes, the next in order, an increase of 7156 tons.

At the latter end of January I issued to the several Agricultural Societies and Shire Councils throughout the colony a circular relative to the amendments necessary to be made in the Fencing and Impounding Bills; also to the several Vinegrowers' Associations, and to a number of private individuals a similar circular relative to the Distillation Statute, and I beg herewith to acknowledge the replies received thereto.

The sum voted by Parliament for fencing and improving Public Parks and Gardens under the control of Borough Councils, Trustees, Committees of Management, &c., has been distributed in accordance with the within schedule. (*See* Appendix T.) Of the total amount, viz., £4500, a sum of £2000 has been equally divided between the three great provincial centres of population, Ballarat, Sandhurst, and Geelong, while the remainder, £2500, has been allotted amongst the other applicants in proportion to the sums contributed locally; each reserve, the expenditure on which exceeded £15, receiving two-fifths of the amount so contributed.

The plan for the laying out of the New Government House and Domain Gardens was finally approved by the Board of Examiners on the 10th of January, and the works commenced on the 23rd of the same month. The first thing to be done was to peg out and define the position of the principal drives and walks; and when this had been effected, the preparation of the borders for planting was commenced. In transferring the plan to the ground, the necessity of accommodating the plan to the natural contour of the Domain was not lost sight of; but when Mr. Sayce, the designer of the plan, undertook the duties of temporary curator, the above-mentioned principle was abandoned, and the ground made to suit the plan, not the plan the ground. Again, in the preparation of the borders for planting, the rule laid down was to preserve as far as practicable the configuration of the surface, filling up where an unusually deep depression or unsightly hollow presented itself, and paring down where an undue elevation occurred. The object of

adopting the above principle in grounds having so uneven a surface was, on the one hand, to avoid the great expense attending extensive earthworks, and, on the other, to preserve the beauty of the natural undulating surface. Owing to the limited funds available—£2000 in round numbers of the £3000 originally voted having been absorbed in the contract for clearing out the lagoon near Prince's Bridge—it became imperative to carry on operations in an economical, and at the same time in an efficient manner. For this object, the entire borders, with the exception of a strip on either side of the main drive leading to Government House, were deeply trenched with the plough, a process infinitely preferable to hand trenching in many instances. The principle adopted was briefly as follows:—The surface was first ploughed up to a depth of about eight inches, and this done, the inverted furrows were shovelled to the edges of the ploughed land; a second furrow was then drawn, and again the soil was removed to the edges; the plough was then a third time passed along the land, but this time without the mould-board, the object being to break up the subsoil as deeply and roughly as possible. The roughly broken subsoil was then left exposed to the sun and wind for several days, in some instances several weeks, to allow the sour, clay subsoil, by the action of the sun's rays and the beneficial influence of the atmospheric agencies, to become thoroughly dried and ameliorated. This having been effected, a manuring of nightsoil, when this could be obtained, was applied, and the trenches then filled in, the soil being returned as it had been ploughed out, the good soil being always kept on the top. The surface soil of the walks was next ploughed up to a depth of eight or nine inches and shovelled on to the borders, thus giving a depth of 2½ to 3 feet of thoroughly prepared land, and at a minimum outlay. When Mr. Sayce took office, the borders to a width of 48 feet on either side of the main drive leading to Government House, had been prepared as above, and likewise nearly all the borders in the neighborhood of the lawn; moreover, all the principal drives and walks throughout the grounds had been defined. I have much pleasure in stating that the proper carrying out of the above works was in a great measure due to the judgment displayed by

Mr. W. Smith, the foreman, in the transfer of the plan to the ground, and in the subsequent management of the limited labor placed at his disposal. An account of the works, effected since the accession of the curator to office, will be found in his report at page 23.

The works in connexion with the cleaning out of the lagoon near Prince's Bridge have progressed most satisfactorily under the supervision of Mr. O'Connor, the engineer in charge. This is perhaps the most marked improvement in the whole grounds; for what was formerly an unhealthy swamp, is by the works effected in this locality, being rapidly converted into an ornamental lake. In the execution of the above works, precautions have been taken to protect the lake against the inroads of all ordinary floods, it having been found impossible, for want of material, to secure it against a flood similar to that of 1863. To have protected the lake against the re-occurrence of such an inundation, a bank 13 feet high would have had to be constructed. It is estimated that, when the proposed improvements to the River Yarra have been made, there will be no cause to fear any damage from floods to the improvements in this part of the grounds. The bank in process of construction along the Yarra is being substantially carried out. Its width at the base is 50 feet, and on the surface 30 feet, and its height 5 feet. The material of which the bank is being constructed is of the best, and the mere weight of the embankment, provided that it have sufficient time to settle down and become covered with couch grass before a flood occurs, is sufficient of itself to resist the force of the water, without taking the cohesive property of the clayey particles into consideration. But to render the embankment doubly secure, it will be pitched throughout its entire length with massive bluestone. When completed, this work will, I venture to say, prove one of the most picturesque, if not one of the most interesting sights in the neighborhood of the city.

Before concluding my remarks on the Government House Domain I wish to refer to the handsome donation of plants made by Mr. David Anderson, of Dean, to these gardens. The plants,

presented by that gentleman, comprise a number of Cedrus deodara, Sequoia sempervirens, Wellingtonia gigantea, &c., and are finer and healthier plants than could have been obtained elsewhere. I have also to acknowledge the presentation, by the City Council of Ballarat, of 200 Platanus occidentalis for a like object.

The State Nursery at Mount Macedon is rapidly being brought under cultivation. Operations were first commenced there in December 1872, previous to which the land was in a state of nature, and thickly clothed with stout gum saplings and the stumps of large felled Eucalypti. The work of reclamation was consequently somewhat heavy, and this was rendered the more burdensome by the absence of available horse-power. By the third week in April, however, six acres had been thoroughly cleared. Five acres of the above had been trenched to a depth of 16 inches by the aid of a plough and a strong team of bullocks, while half an acre, which is to form beds for the reception of seed, had been trenched by hand. A number of seeds of Californian and other trees have been since planted, and a number of cuttings of various deciduous trees put in. A collection of plants has also been removed from the Botanical Garden and carefully planted out into nursery rows, that they may get well rooted and become available for distribution during next season. A fresh area of the nursery is now in process of reclamation. This will be held in readiness for extensions to the grounds, as the increase of the nursery stock may render necessary. The nursery is now in a fair way of progress, and the natural system of raising plants practised therein, will insure the production of healthy trees. Before concluding my observations relative to the work which has been effected at the State Nursery, I wish to acknowledge the donation of a valuable collection of seeds of exotic trees from the Horticultural Society of Victoria, of some seeds of the mulberry from Mrs. Bladen Neill, and a bag of haws of a valuable variety of Cratægus from Mr. David Ewart, of Murchison. Full particulars will be found in the report of the superintendent, at page 39.

One of the objects of this department will be to write from time to time, or to obtain from the pen of persons outside the department well versed therein, an account of the agricultural industries, their establishment and development, up to the end of the year 1872, or virtually to the date of this department being established. This has already been commenced, the Rev. J. I. Bleasdale, D.D., having kindly written the history of two industries, viz., the wine growing and the meat preserving industries from their foundation up to the present time. Next year it is proposed to continue this practice, when the hop-growing and other industries will probably be selected. The object, which this department has in view by adopting the above-mentioned course, is to collect such information as will enable it hereafter to publish a volume upon the condition of Victorian agriculture at the time of its foundation.

There is one other subject to which I desire respectfully to call attention; and that is the waste of power consequent upon the distribution among other departments of the service of matters appertaining to agriculture, which should be under and form part of the Department of Agriculture. I allude more particularly to the prevention of diseases in live stock, and to the collection of Agricultural Statistics. If the information, gleaned by the officers of these departments, were submitted to the Department of Agriculture, and by it disseminated in a concise printed form throughout the colony, I venture to suggest that such a course would tend greatly to promote both agricultural and pastoral improvement. At present people in all parts of the country know not where to apply, when needing information on any given agricultural subject. Hence, if all matters appertaining to agriculture were gathered around one centre, not only would a considerable saving be effected, but a great benefit conferred upon the community. Further, the reports of the officers above referred to, and the papers which they from time to time might write, and the lectures which they might deliver on subjects relating to agriculture, would both add materially to the value and interest of the annual departmental report, and widen the field of knowledge to the rising generation of farmers.

In concluding this my first Report, I beg respectfully to be permitted to point out the necessity, in the interests of this department, for some definition of its duties. In every other country where a Department of Agriculture has been created, it has been ushered in by an Act of Parliament, defining its several duties and the subjects over which it shall have control. I would therefore respectfully urge the adoption of a similar course in this country.

I have the honor to be, Sir,

Your most obedient servant,

A. R. WALLIS,

Secretary for Agriculture

PLATE I.

Plan of the
GOVERNMENT HOUSE
AND
DOMAIN GARDENS

Designed by Joseph Sayce Esq.; Caulfield.

Lithographed at the Department of Lands and Survey by Govt. Printer
Melbourne. April 16th 1873

Scale.—132 feet to 1 inch.

Photo lithographed at the Department of Lands & Survey Melbourne, by J. Noone.

REPORT

OF

CURATOR OF GOVERNMENT HOUSE DOMAIN,

With Photo-Lithographed Design and Notes explanatory thereof.

Government House Domain,

SIR, 1st June 1873.

I have the honor to submit a Report on the progress that has been made in the work of laying out the grounds in the Domain up to the present time, and a statement of what I propose to accomplish by the end of the month, and during the ensuing year.

When I assumed the responsibility of these operations, on the 14th March, but little had been done; the Government House drive, a small portion of the public drive, and the walk surrounding the private lawn, had been marked out and cleared of trees. The former had been ploughed up, and strips of ground on each side had been subsoil-ploughed.

Since that time, a large portion of the labor at my disposal has been bestowed on the private drive and borders, the work on which has been extremely heavy, owing to the configuration of the ground and the hard nature of the subsoil. This heavy work is now completed — about 14,000 yards of earth having been removed, and each of the borders is planted with three rows of ornamental trees, viz., Araucaria imbricata, Cedrus deodara, and Sequoia Wellingtonia, which, in course of time, will assist in forming a noble avenue. The roadway has been formed with proper gradients, and is ready for metalling, and for laying down two main drains, which will ensure the effectual drainage of both drive and borders. A deep drain has been put in between the north border and the high ground adjoining, to intercept the water on that side.

A large portion of the footpaths bounding the intended new public carriage drive within the grounds—from the St. Kilda road to the corner of the Domain road and Anderson street—about one mile in

length—is completed and planted, and I am using every effort to have the whole finished and planted this season, that the trees—about four hundred in number—may make good growth in the spring; and that the numerous pedestrians who now use the various walks that intersect the Domain in all directions may not be inconvenienced as the laying out of the interior ground is being proceeded with, when these walks will have to be permanently closed. For the accommodation of the large number of persons who reside between the upper and lower entrances from the Domain road, I intend forming a footpath from the wicket-gate opposite Millswyn street to unite with the one on the south side of the drive, as shown on the plan. The entire distance, from the Millswyn street entrance to the St. Kilda road gates, will be about the same as that of the much used "willow walk," the trees in which, to judge from the time they have been planted—about eleven years—will never attain any reasonable size. The footpaths bounding this drive—on which also numerous seats will be placed—are being planted with the large-leaved plane (P. orientalis), as being the best adapted to withstand the smoke of a large and increasing city; these trees will, in a few years, afford acceptable shade to pedestrians, in consideration for whom this latter feature has been specially introduced, somewhat at the sacrifice of the greater picturesqueness and freedom afforded by landscape scenery; the fine views will, nevertheless, in various ways, be preserved. The course which this drive takes over the higher ground—for the sake of the views—is the one decided upon by the judges of the designs; but thinking that its proximity to the Observatory might, perhaps, have been overlooked, and might possibly be objectionable, I referred the matter to Mr. Ellery, who, after some investigation, assured me that there would be no objection whatever to the road taking the course decided upon; and, after frequent and careful inspection of the whole ground, I consider that this position of the drive is, in all respects, the best that could have been selected; any other would have been over low ground, and where a good deal of cutting would have been necessary.

In the formation of this road there will be some heavy work in filling up the large excavations that have been made in the Domain, which are perfectly useless, and contain only stagnant and muddy water, besides being ugly blots in the landscape. They could never be converted into ornamental lakes without materially altering their contour, and pitching the sides to keep the water clear, the cost of which, and of maintaining an artificial supply of water, would be quite unwarranted. I may here mention that trees of considerable size from various parts of

the ground, where they came in the way of the drives and walks, or required thinning, have, by means of the tree-lifters which I have had specially constructed, been transplanted to the vacant ground at the boundary with good effect; a number of trees have also been transplanted to other portions of the ground as required, and all are doing well. The timber of the gums and wattles that have been cut down has been carted to the engine-house for fuel. The formation and metalling of the roadway should be proceeded with as soon as the planting of the footpaths is finished, as the contractors for Government House will be obliged to use a portion of it when the necessity exists for their exclusion from the old road by the laying out of the private gardens. The tree-guards already on the ground have been used as required, but more will be wanted for the preservation of the interior grounds. I propose enclosing this carriage drive on each side, including the footpaths, with light iron fencing, and to erect similar fencing round the boundary of the Government House gardens. It is very important that this be done speedily, as otherwise much damage may be caused to the progressive improvements, the work generally may be delayed, and the expenses unnecessarily increased.

While the excavations for the lakes have been in progress, I have taken the opportunity to have a large quantity of the earth carted therefrom, and stored in various parts of the Domain, such earth being essential to the healthy growth of many of the most ornamental plants; and for the general improvement of the soil here, which is of a very poor description, no opportunity has been lost of obtaining manure; the main source hitherto available has been the large depôt of the city refuse near Adderley street, at the extreme west of Melbourne, but the great expense of cartage from so long a distance has prevented this from being so largely used as its value deserves. Most of the present accumulating city refuse and street scrapings is used in the different reserves under the charge of the Melbourne Corporation and the Assistant Commissioner of Lands and Survey; but it is to be hoped, as the gardens in course of formation are for the advantage of the public generally, and as Melbourne especially will be benefited by them, that the City Council may be induced to allow a portion of this manure to be carted to the Domain. The general question of a large and regular supply of fertilizing agents is of vital importance to the future success of the Domain gardens.

During the progress of the work on the new carriage drive I have correctly delineated the boundary of the private lawn and the drives, and some of the shrubbery walks around and branching therefrom, with

the walk round the intended lake at the lower extremity of the lawn. A winding walk, about 2000 feet long, in some places intersecting, at others exterior to the private drives, has been correctly marked out, and borders on each side, expressly for flowers and flowering shrubs, are being prepared, so that there may be a good floral display next season. The gravel on the crown of the hill, being so near the surface, is being removed, and will form an excellent covering for the adjacent paths; and the whole ground forming this lawn is being plough-trenched, that a good depth of soil may be secured for the specimen trees and groups that are to be planted therein, and that the grass may always retain a verdant appearance without the aid of constant artificial watering. The croquet lawn I propose to form early, that by continual rolling and mowing a close and even sward may be obtained in good time, it being important that grass-sown lawns should not be used during the first year after sowing, where a permanently good lawn is of consequence. The ground intended for an American garden has been properly excavated, and soil for filling in has been carted up, and will be wheeled on as soon as some peat soil can be procured. I intend completing the preparation of the gully as soon as possible, that the tree and other ferns just obtained may be planted in proper time. It will be advisable to construct a bridge or viaduct over the fern gully, not only for the sake of ornament, but for facility of access from one side to the other. A bridge will also be necessary lower down, where the esplanade crosses the gully; the former will be a conspicuous object from the private lawn, and might be of iron, of a light and graceful design; the latter would do if constructed of timber.

I shall make an effort also to have the long esplanade completed in time for next season's planting. This work will be somewhat heavy, on account of the excavation that will be necessary, but it will be so attractive a feature in the grounds that it will be worth all the labour bestowed upon it; it will be 2000 feet long, and will unite with the pine walk in the Botanical Gardens.

In order to lay out the main portion of the public, or "Domain gardens," it will be requisite that the whole of the Immigrants' Home buildings should be removed. Besides being a great disfigurement to the grounds, their removal is absolutely indispensable to the carrying out of the design, especially in the union of the upper ground with the lakes. That there may be no hindrance to the work, the whole of these buildings, with the others near to them, should be cleared away by the end of October at the latest. Some of the most ornamental features of the gardens will occupy their site, therefore all the more requisite that

they should be speedily removed, to give time for the elaboration of this portion of the gardens.

Besides the Immigrants' Home buildings, there are several smaller ones scattered over the ground that should be quite cleared away, as they also will interfere with the carrying out of the plan. A schedule of the whole is appended hereto. Those connected with Brander's ferry, and the ferry itself, should be at once removed, as they stand in the direct way of important embellishments, both in the private gardens of Government House, and the Domain gardens; and the existence of a public thoroughfare at this point is quite incompatible with the general features and privacy of the gardens. The American garden, the fern gully, the viaduct and its surrounding ornament, the esplanade and the picturesque bank below, the walk or drive on both sides of the long lake, and the lake itself, would all be interfered with were the said ferry and buildings allowed to remain; indeed the completion of these portions of both gardens would be altogether prevented.

Whilst alluding to these obstructions to the laying out of the gardens, I may mention that they are so situate that only a very small portion of the interior can be laid out at all whilst they exist, and none whatever can be *completed* until they are removed, and the traffic is diverted from the old road, and from the numerous walks that intersect the ground. The completion of the two drives before alluded to will effect this diversion fully and finally; their formation was, therefore, indispensably necessary preparatory to the general laying out of the interior.

The terrace gardens and parterres adjoining Government House cannot, of course, be laid out until after the terrace-walls, steps, and balustrades are completed, and the fountains are erected, which important details I would suggest should be commenced as soon as the heaviest work in connexion with the main building is completed.

But for the very liberal advance, the large quantity of work that has been got through could not have been accomplished in so short a space of time; and with the continued necessary financial support, a very large area of ground will be ready for planting next season, when it will be needful to embrace the very earliest opportunity to commence this important work, and to continue it with vigour, in order that all the prepared ground may be furnished, and the plants firmly established by the following spring.

I beg to recommend that prizes be offered for the best designs for a conservatory, and that tenders be invited in the colony for its construction; also that the sum of £5000 be placed on the Estimates towards its cost, and that of other necessary plant houses, &c. It will be neces-

sary to erect a propagating house and pits almost immediately, in order to supply the gardens and conservatory with the necessary plants, and for the preservation, until wanted, of plants received from time to time from other parts. I may here mention that the very fine collection of palms, brought over by yourself from New Zealand on your recent visit, are being properly cared for in temporary frames, and are doing well.

One important matter remains to be noticed. In preparing the ground for planting, I have not hesitated to adopt the only course to ensure success in the growth of the trees—that of trenching, by the spade or plough, the whole of the ground. Although the first cost is necessarily heavy, this will be more than compensated for by the vigour and symmetry of the trees, and by the large saving that will be annually effected by the ground not requiring irrigation. Thorough drainage of all the flat and low ground will, as a matter of course, also be required, to prevent the trenched ground from becoming sodden by the rains in winter, and to preserve a cool and even temperature at all times. I know of no two conditions so essential to the healthy growth of plants of every kind as deep drainage and trenching in large areas.

I have the honor to be, Sir,
Your most obedient servant,
J. SAYCE.
Curator.

The Honorable
The Minister of Lands and Agriculture,
&c., &c., &c.

SCHEDULE OF BUILDINGS, ETC., EXISTING IN THE GOVERNMENT HOUSE DOMAIN THAT REQUIRE TO BE REMOVED.

1. The Immigrants' Home buildings.
2. Quarters now occupied by members of the local military, policemen, &c., and formerly by officers of the 40th Regt.
3. The ordnance used for firing salutes and drilling purposes.
4. The Engineers' pontoon shed } since removed.
5. A cottage adjoining ditto }
6. A cottage at Brander's ferry.
7. A cottage at Brander's branch ferry.
8. A cottage in the quarry near above, unoccupied, but claimed by Thos. Gulliver, a laborer employed on the grounds. A very poor place.
9. A cottage in the nearest hill quarry to the Botanical Gardens, occupied by Thos. Gulliver.
10. A cottage in the third quarry between Prince's Bridge and the Botanical Gardens, occupied by Mr. Brander, the lessee of the ferry.

11. A building near Anderson street, used partly as a laboratory and partly as a residence.
12. A cottage occupied by the carter of the Botanical Gardens.
13. The stables originally built for camels, part of which is used as a tool-house and shed for the Domain gardens, and part as a stable for the Botanic Gardens.
14. A cottage occupied by one of the gardeners employed in the Domain.

DESCRIPTIVE NOTES RELATIVE TO THE MORE IMPORTANT PARTS OF THE DESIGN FOR THE GOVERNMENT HOUSE GARDENS AND THE DOMAIN GARDENS.

As Presented to the Government of Victoria by Joseph Sayce, Esq.

Grand entrance-gates, opening into a carriage drive exterior to both gardens. This ornamental drive or "rotten row" (*route de roi*), or, more appropriately, ladies' drive, extends from this entrance southwards, to the "South Yarra gates" at the corner of the Domain road and Anderson street, and by a branch to the "St. Kilda gates" at the lower end of the Domain road; and northwards, skirts the chain of lakes, and winds round the head of the upper lake in returning. The entire length of drive, including the return, is about four miles.

The footpaths are planted with a double row of umbrageous trees; the inside rows for the entire distance being composed of oriental planes; the outside rows of the southern half being also of planes; on the river side of the other half or lakes' portion, the trees are elms, willows, and planes alternately, and on the lake side, horse-chestnuts, weeping elms, and balsam poplars.

Government House Gardens.

Entrance-gates, under a lofty archway, with a smaller archway on each side for the guard &c.—a guard-house adjoining, or forming a portion of the structure; the wing-walls terminating with high ornamental piers. The architecture of the whole in accordance with that of the mansion.

Carriage avenue, bordered on each side, on grass, with three distinct rows of noble trees—araucaria imbricata, cedrus deodara, and sequoia gigantea; all the trees planted on raised platforms, to induce a graceful downward sweep of the lower branches, so ornamental in commanding positions where abundant space is given.

Carriage-sweep, in front of private and official entrances, with grass margin and slope, and stone steps on to the lawn with piers; vases on the piers, and at intervals on the grass margin.

Circular bed of evergreens, with a margin of grass surrounding it, opposite official entrance.

Large ornamental vase on high pedestal, filled with plants in flower, and with trailers depending therefrom, standing on a circle of grass, opposite private entrance.

Group of evergreens, at the corner of court, to relieve its hard and bare appearance and to hide the path to stables, &c.

Quadrangular court, having access from the ball-room and state drawing-room, with ornamental fountain in the centre, and raised beds with architectural margins for plunging pot-plants; the space around the fountain is sufficiently wide for seats when required. This court, paved with tiles or marble, with the beds as above, will be an agreeable evening promanade.

Ball-room entrance-platform, with balustraded walls, and grass margins within; a vase in the recess on grass; thick shrubbery on the bank below.

Lawn in front of mansion. This has been kept very open to give breadth and extent, but the wide expanse of grass is relieved by occasional groups of some of the more beautifully foliaged trees, and by single specimens of a highly ornamental or unique character; also, here and there, by irregular masses of flowering shrubs, and some of the larger and bolder kinds of herbaceous plants, sufficient to add gaiety to the scene, without detracting from the repose and grandeur of the larger subjects.

Upper terrace, extending southward to the end of orangery, and terminating at an aviary; at the other end are steps to shrubbery paths, and in the centre a double flight of steps down to the terrace-garden below; vases, with plants in flower, on all the piers, and a sun-dial in each of the recesses.

Drawing-room flower-garden, laid out on grass; tazzas in the small circles; large vase on a low pedestal in centre, so as not to intercept view of fountain in the orangery adjoining—the camellias in which will form an agreeable background.

Orangery, with fountain in the centre; the whole surrounded by camellias.

Central terrace, with flower-garden on grass, in three compartments, besides the borders; architectural basin and fountain in centre compartment, and statues in the side ones; vases on pedestals at the corners,

and tazzas in the circular recesses ; the paths of gravel, climbing roses against the wall, the borders of grass, with detached flower-beds alternated with variegated hollies and biota aurea.

Lower terrace, supported by a grassed slope with stone steps and piers ; standard roses being in the separate circular beds on the grass margin, on one side of the path ; and herbaceous plants, bulbs, &c., on the other side; with bignonias, passifloras, and other choice climbers against the wall at the back ; and ericas and epacrises in the eastern border.

Rosery; commences with an arched walk of roses (with beds and pillars on each side), leading to a circular group of beds, with a weeping rose in the central one ; a similar arched walk at the other end leads to the kitchen-garden.

Compartment for choice *flowering shrubs;* the path bordered with fastigiate shrubs on a margin of grass.

Bed of rhododendrons, the centre plant eventually to fill the circle.

Summer-house, commanding views of the sea-horse lake, the viaduct, &c.

Viaduct over the fern gully ; having light iron, high, and open balustraded sides, on wooden sleepers and supports. A fine view of the fern trees, &c., on the lower, and of the American garden on the upper side, will be obtained from this structure, which will form a very effective

Hanging-garden, with climbers trained up the light iron pillars, and trailers sending their pendulous shoots downward into the cool moist atmosphere. These can easily be grown in recesses within the floor, the superfluous water falling on the ferns below.

Fern gully, formed by enlarging the ravine previously existing here. The water from the fountains above, meandering between the stones and rocks in the irregular bed of the ravine, occasionally forming a light cascade, with the shade imparted by the taller vegetation of tree-ferns, eurybias, blackwood, &c., intermixed with the deciduous cypress, copper beech, &c., will ensure a congenial atmosphere for the denizens of the Victorian and Tasmanian mountain gullies. A portion of the ravine above the viaduct is formed into an

American garden, where the choice varieties of hybrid rhododendrons, Ghent azaleas, andromedas, kalmia, ledums, and other heathworts, will be quite at home ; several of the finer kinds of Californian and Japan lilies may also be grown here to advantage. Paths from the ground above lead through this garden. At the higher end of this gully, where it unites with the more open ground, are Alpine plants.

Sequoia sempervirens, occupying the circle at the end of path from viaduct, where from its low position it will, in all probability, grow into a noble tree. The diverging paths lead to various parts of the grounds.

Upper pool or lake, with a jet d'eau rising amidst a group of water-figures. From a rustic arbour on the north side of the adjoining walk, this pool, backed by the sloping grass bank on its southern boundary, with two or three characteristic statues half screened by the thick foliage fringing the water, will form a pleasing and refreshing object.

Croquet and archery ground: an enclosed sunken lawn, adapted either for three sets of croquet—being 200 feet long by 100 feet broad within the verge—for archery, or for a bowling green. A gravel path runs all round, on which are eight seats; and just within the surrounding shrubbery are four rustic arbours from which the games can be witnessed. Vases, with plants in flower, stand on the margin of grass above the slope, and at each end is a statue on a pedestal.

Ornamental iron gates divide the private from the public gardens. A fine view of the conservatory and of the parterres and statuary in the foreground will be obtained through them.

Home drive commences at the top of the carriage avenue, makes the entire circuit of the lawn, and taking in some of the best views in its course, skirts the grass bank and shrubbery above the pool, and passes the conservatory gates and other objects of interest.

The views from nearly every part of the grounds are interesting and extensive; those from the terraces, private drives, and portions of the lawn specially so. There is a good view also from the mansion and upper terrace of the conservatory. In the views from the north-eastern windows and from the terraces, the viaduct will form an interesting feature in the middle distance, and will suitably connect the high art of the terraces with the more natural scenery beyond.

Carriage-stand, approached from all the entrances, and from the stables. In the centre, a simple jet d'eau and basin standing on a circular stone causeway, with three gas pillars and lamps at the margin, and water-troughs supplied from the basin between them.

Stable-court.—(*See* detailed references at the end of these notes.)

Gardener's cottage with court, and access to gardens behind.

Fruit-garden—the old slip slightly curtailed—contains a lean-to vinery, two propagating houses, potting shed, manure-pits, covered sewerage tanks, and central open tank for water.

Kitchen-garden, with two open tanks for water, and covered double tank for sewerage.

Gardener's yard, with pits, frames, potting and earth sheds, tool-house, &c.

References to Stable department.

Stable yard, enclosed with iron gates and railings.
Open basin for water in centre, with stand-pipe and hose.
Stables, with iron fittings.
Coach-houses, with hay-room over.
Loose boxes.
Stables for visitors' horses.
Shed for visitors' carriages.
Manure-pits.
Closet, &c.
Harness-room, with porch at front, and clock-tower over it.
Room for cleaning harness, implements, &c.
Granary.
Men's rooms.
Visitors' harness.

Domain Gardens.

Broad walks, to allow of the assemblage of a large number of persons, leading to the conservatory, the esplanade, and to all the principal parts of the gardens.

Conservatory, with distinct compartments at the corners, communicating with the main building, for orchids, ferns, the Victoria regia, and other stove aquatics respectively. The large and lofty central portion will accommodate a great number of the taller growing tropical palms and other plants, besides ornamentally-foliaged plants generally, tropical climbers, &c., &c. A broad path runs round the central ornamental fountain, which, with one from each end and side intersecting it, and one running all round, will afford ample space for visitors.

Conservatory plateau, or terrace, surrounded with grass margins and slopes ; a statue at each corner, and vases with plants in flower on the grass margins between.

Flower-garden on the south side, with fountain in centre, and vases on pedestals at the intersections.

Upper and lower lawns, planted here and there with umbrageous trees, and others for diversity, with groups of evergreens, grassed platforms for dwarf specimens, dracænas, yuccas, and other plants with bold striking foliage. The walk dividing the two lawns is sunk, so that in the view from the upper walks and conservatory the continuity of the

long stretch of grass appears unbroken. The seats on this walk will command extensive views.

Rosery, containing numerous beds of the different varieties in contrasting shades of color, besides standard, weeping, pillar, festooned, and arched roses. The beds are all on grass, but a wide gravel walk runs round the whole, and it is surrounded by dense shrubbery, just within which are eight alcoves.

Temple of Æolus, on the prominent position overlooking the lakes.

Esplanade, cut in the side of the hill, and overlooking the sea-horse lake, &c. This walk is 2000 feet long, and is furnished with numerous seats, umbrageous trees being planted between them, which, aided by the high ground on the west, will afford a delightfully cool retreat on a summer's afternoon. There is a statue at the south end of the walk, behind which is a path uniting with the pine-walk in the Botanical Gardens. The bank just below is planted with flowering shrubs, and, at even distances along its upper margin, cupressus torulosa, alternated with araucaria Bidwilli.

Tropical dell, planted with palms, dracænas, and a variety of other plants requiring a warm and humid atmosphere ; larger trees being planted on the banks for shade and shelter ; water from the fountains above runs through the dell to the lake, forming a sort of cataract.

Rockery, and grotto within. A walk runs under a portion of the rockery that here forms a rude arch communicating with the grotto. The exterior crevices and ledges of rock are planted with various rock plants and ferns ; and Ayrshire roses, brambles, and other roseworts mingle their straggling branches amongst them, the exterior forming an interesting rock-garden.

Carriage concourse ; a large open space where carriages may assemble without their occupants alighting. The ground, being elevated, will command a fine view of the lake scenery, and will be within good hearing of music on the pier.

Lakes, formed in the present swamps by throwing up wide banks on the river side, and where otherwise requisite ; the margins from above to below the water-line to be pitched with rough stones ; all the unplanted slopes grassed to the water's edge, and the precipitous and stony margins clothed with various rock and water plants. The banks planted with willow, alder, horse-chestnut, maple, beech, silver and balsam poplar, lime, laburnum, &c., intermixed, for winter decoration, with the eurybia, doryphora, the evergreen taxodium, cryptomeria, arbutus, and other moisture-loving evergreens ; also, for variety of tint, the red maple, and scarlet oak, and the copper and purple beech

in the cooler parts; and rhododendron ponticum wherever a shady spot can be found towards the margins.

Islands in the lakes, planted similarly, and with birch, bambusa, dracænas, yuccas, &c., on the higher ground; also, towards the margins, taxodium distichum, tamarix, magnolia glauca, pampas grass, &c., and in the shady nooks and bays on the southern sides, rhododendron ponticum in large masses, and clumps of richardias, backed by arbutus, Portugal laurel, copper beech, hollies, common laurel, thorns, &c.

Islets, some covered with the gayer hybrid rhododendrons, Ghent azaleas, &c.; others with a single plant of the heracleum giganteum, some also with groups of yuccas, &c.

Rustic bridges over portions of the lakes.

Pier overlooking the great lake, surrounded by a balustraded parapet; and in the centre a canopied orchestra for music when required. The approaches through a triple arch of tacsonias.

Aquatic temple at the margin of the great lake, with boat-house under.

Kiosque, on a grassed knoll overlooking the lakes.

Sea-horse lake; so named from the design for a fountain proposed to be erected in this lake. Subject: four mythological horses in a prancing and snorting attitude, the water spouting from their nostrils, ranged round a group of naiads, two of whom are enjoying the descending spray, while the other two are contending for the possession of a large sea-shell, from which rises a lofty jet d'eau. The banks behind, being thickly planted in a picturesque manner, will form a congenial back-ground in the view from the lower walk, the esplanade, &c. Groups of the nymphæa, and other aquatics, planted near the margin at both ends, will add to the interest of this lake, and impart to it the character of an

Aquarium, where every kind of water-plant, not positively tropical, will grow amazingly.

Shady arbours in many parts of the ground, also open *seats* and *drinking fountains*.

Additional Observations.

It has been a special aim, in the formation of this design, to produce, in its main features of lawn and landscape, breadth and grandeur of effect, to accord with the fine proportions and style of architecture of the mansion; that high ornamentation, congruous and kindred in character,

should be the leading feature in the parts contiguous to the private portion of the residence, the conservatory, and in other parts of the public gardens; that variety, diversity, and an aspect of seclusion should characterize the more distant grounds; that the water scenery should, in its apparent unartificiality, be in keeping with the general landscape; and that unity of expression should prevail throughout.

To avoid, on the one hand, a surfeit, or redundancy of the highly-florid features that characterize most English gardens of note at the present time, and, on the other, the substitution of a tame, bare, and mere *park*-like landscape for the more picturesque, more diversified, and more interesting and cheerful one of a *garden*, have been equally a study. And though the ground generally has not been cut up into fragments by a multiplicity of walks, and isolated flower-beds, or reduced in its apparent extent by over-planting, it has been invested with scenes and objects of interest sufficiently numerous to exclude from it a character of poverty and meanness.

In the formation of the landscape (supposing the trees to have attained a moderate size) it has been endeavoured especially to combine, with picturesque arrangement in the grouping, and variety in the sky-line, appropriateness of site, both as to position and aspect, for all the trees: for instance, in the cooler and moister parts, that are sheltered from the hot sun and high winds, either by the configuration of the ground, or by the planting the abies, larix, taxodium, Cunninghamia, cryptomeria, with some of the pinus family and other coniferæ; also the acer, fagus, tilia, and many other families may find congenial positions; whereas, on the higher, or more open ground, exposed to all the fury of perennial blasts, both hot and cold, are placed many of the hardier conifers, including the cedars, as well as some of the more ornamental deciduous forest trees, as the fraxinus, quercus, platanus, &c. The more tender conifers, that will not stand against high winds without disfigurement, as the piceas, the araucarias, the Leichardtia (octoclinus), the retinosporas, and other Japanese conifers, and the Japanese trees generally, are placed, more or less, in shade or shelter. The shrubs and smaller subjects, whether requiring heat, shade, or moisture, or any or all of these combined, will find numerous localities suited to their growth.

The rhododendron has been frequently mentioned in these notes when alluding to the planting. I may here, therefore, observe that these much neglected but very showy shrubs will, if judiciously planted, thrive amazingly, with very little care, in the localities indicated for them; and I do not think it possible to overstock the gardens with these beautiful heathworts and others of a kindred nature.

A liberal display of ornament has been provided for in the public gardens, where diverse tastes must necessarily be consulted, but nothing tending to vulgarity or puerility has, it is believed, found a place there. Considerable boldness has been given to the design for the conservatory and the walks leading thereto; the latter are wide, to allow of the convenient assemblage of large numbers of persons, the crowding of whom in narrow paths would mar the general effect, besides being otherwise objectionable; the floral compartments are consequently large and bold also, but the gaiety of these is toned down by the wide expanse of lawn and sylvan landscape that stretch away from them down to the lakes. Designs for the flower-beds, ribbon-borders, and other parts, the details of which are difficult to show on a small scale, are either entirely omitted, or, where shown, are merely suggestive The taste of the curator (when appointed) will be able to provide amply for their embellishment.

In the formation of the lake scenery I have attempted to delineate some of nature's happiest and most pleasing features, as far as the extent of water would justify, without unduly crowding individual objects. The irregularity of the margins, both lineally and in their elevation, will, when properly planted, have a natural and picturesque appearance. The insulated landscape has been so treated that the extent of the water can only be surmised, which, with the increased distance imparted by the partial concealment of otherwise prominent objects, will give breadth and freedom to the whole picture, the life-like character of which will be enhanced by an artistic but unobtrusive structure being seen here and there jutting over the water, or partly hidden in the recesses of a grove; and when the gorgeous masses of rhododendrons, yuccas, and other plants and trees are in flower, the attractiveness of the lakes will be greatly increased, and they may possess an interest to some, little, if any, inferior to that of the most highly embellished portion of the grounds. The pier, from its commanding position on the water, will be an excellent place for out-door concerts, there being ample room on the pier itself, the adjoining walks, the lawns above, and the conservatory terrace, for thousands of listeners; whilst to those on the shrubbery walks on the other side, and the Yarra drive, with the water intervening, the music will probably offer even greater attractions.

The laying-out and planting of the grounds, I need hardly observe, will be a matter of the highest importance, scarcely second even to the design itself; for if this is not well and judiciously performed, not only will the intentions of the designer be frustrated, but any merit his plans may possess will be nullified, and ugliness, instead of beauty, will be the result.

In any case the formation of two distinct gardens such as these should be—the one, a worthy adornment to a vice-regal residence, the other suited to the improving and increasingly critical tastes of the inhabitants of the most important Austral division of the empire—must necessarily be a costly matter; and being for the national advantage, for the enjoyment of the population of the whole colony, they should, I submit—to be upon a par with other kindred institutions, and to be in accordance with the cultivated taste of the present age, which yearns for the artistic and the beautiful whenever leisure can be afforded to enjoy the advantages they unquestionably confer—be not only liberally but bountifully provided for.

REPORT

OF

THE INSPECTOR OF STATE FORESTS.

State Nursery, Macedon, 1st June 1873.

Sir,

I have the honor to submit the following report of the work which has been executed in the State Nursery since its establishment in December 1872 to the present date.

Previous to commencing operations here, the land was heavily timbered with stringy bark, gum, and messmate saplings, and a number of heavy stumps was interspersed throughout the whole area, which took a great amount of labor to get them grubbed and removed.

Having no horse-power available for removing such heavy timber from the land, and being anxious to have the ground cleared as speedily as possible, I caused the saplings to be cut into convenient lengths, and when dry piled in large quantities around the heavy logs and large stumps. These large masses of timber and branches, when set on fire, soon consumed the stumps and logs, reducing them to heaps of ashes without further trouble. The above method I found to be the most effectual way of clearing the land; besides, the ashes, when spread over the ground, were of great value as a fertilizer.

The cost of grubbing, burning, and clearing in this manner averaged something about £10 per acre. Six acres have been cleared in a satisfactory manner, five acres of which have been ploughed and subsoiled by bullock teams to a depth of from 16 to 18 inches, quite as deep as I consider necessary for the purpose required in this locality.

About one acre has been trenched by spadework 18 inches deep; the former method cost £5 10s. per acre, and the latter £26 per acre, thus showing a great difference in the cost of the two methods. One advantage in favor of the subsoil plough was that, the land being on a gentle slope, the furrows could all be turned one way, and down hill. The horse subsoiler followed the bullock plough in the same furrow,

deepening the subsoil, but not bringing it near the surface. This system I propose to follow with the remainder of the ground in this reserve required to be planted with young trees.

The area of this nursery reserve, 41 acres, is securely fenced with a substantial four-rail fence of split timber, inside of which a strip of ground has been subsoiled, and steps are being taken to plant a permanent quick-set hedge, to replace the post and rail fence when decayed, and to afford shelter and ornament to the grounds.

Divisional fences, of approved hedge plants, are being planted throughout the cultivated portions of the grounds, at equal distances, to afford shelter to the young trees planted in the several quarters of the nursery. About two acres of the trenched ground is now planted with thousands of the choicest and best kinds of Himalayan and Californian timber trees, and I am in hopes that about the beginning of July the whole area of trenched ground will be filled up, and thousands of young timber trees will have been planted, the greater portion of which will be ready for forest planting next season.

Considerable numbers of the best kinds of English and American timber trees are being planted in nursury rows in suitable soils, and the Jarrah, of Western Australia, and Redgum, of Victoria, will be largely grown for supplying some of our denuded forests in suitable localities.

The seeds of several species of timber trees, sown in April, have germinated freely, and will furnish a large supply of young trees for next season's planting out in nursery rows.

Quantities of acorns from old trees have been sown, also white thorn, and several other kinds of hedge plants, which will furnish numbers of young plants at the proper season.

A consignment of forest tree seeds from Europe is shortly expected, so that a number of young trees for future plantations will always be progressing.

Quantities of the best kind of Elm, Platanus, and other deciduous trees that are best grown from cuttings will be put in the ground immediately, and steps are being taken to plant out for permanency a stool ground for such trees as will require to be raised from layers, grafting, and other methods.

An area of 50 acres, near the summit of Mount Macedon, has recently been selected for experimental culture of forest trees, where it is contemplated to plant large numbers of the Deodar cedar, the Himalayan spruce and silver firs, as well as several species of European timber, for the culture of which the high altitude of this locality is well adapted.

A considerable portion of the Macedon ranges is entirely denuded of timber, and presents a good opportunity for testing many of the timber trees of Europe.

In order to carry out the intentions of the Government in the matter of forest planting and rearing of young trees for that purpose, a similar area of the ground that has been prepared this season will require to be shortly in process of clearing and subsoiling, so as to meet the demand for space next season. A like area will require to be prepared year by year until sufficient ground shall have been got ready to meet the yearly increasing demand that will arise for forest trees of all descriptions.

To maintain in proper condition what has already been carried out, and to meet the requirements of next year, it will require a considerable sum of money to be granted by the Legislature, and forest culture being a matter of national importance, Parliament will doubtless not hesitate to sanction a reasonable expenditure. The wanton destruction of forests, and the increasing demands for timber, require urgent action being taken to replant and conserve our forests before it is too late. Not only do trees require to be planted, but seeds of our indigenous trees should be gathered and sown by thousands of acres annually.

I have to report the receipt of a packet of Redgum seeds, collected on the Murray River, by the Crown Lands Bailiff at Echuca.

I have also the honor to report that three cottages are being erected on the State Nursery Reserve, and which will be occupied by myself and some of the employees.

I have the honor to be, Sir,
Your most obedient servant,
WILLIAM FERGUSON,
Inspector of State Forests.

A. R. Wallis, Esq.,
Secretary for Agriculture.

APPENDICES.

APPENDIX A.

SHEEP BREEDING ON FARMS.

BY THE SECRETARY FOR AGRICULTURE.

Now that our richest agricultural lands are gradually passing into a state of exhaustion, or, to speak more correctly, now that these are rapidly becoming grain-sick, and refuse any longer to give a remunerative return of cereals, it is rendered daily more and more apparent that to make farming profitable, more particularly in our oldest settled agricultural districts, the rearing and grazing of stock must go hand in hand with tillage husbandry. Then arises the question, what description of stock is the most profitable for the farmer to keep? This query, I think, may be easily answered. The sheep undoubtedly, of all farm animals, is the one which gives the largest and most speedy return for capital invested, besides being a valuable auxiliary to tillage husbandry; hence it may be regarded as the most desirable stock for the colonial farmer. But, of the various breeds, which is the best adapted to our climate, and which the best suited to supply our wants? The Merino, from its lightness of fleece, its smallness of carcase, its inability to arrive at early maturity, its propensity to roam and consequent unsuitableness for confinement, is certainly not the kind of sheep which the farmer should keep. Nor is it probable that any one of the British races will prove suitable to the very varied conditions of our soil and climate. In the different districts of Great Britain we find various breeds of sheep admirably adapted to the locality which they occupy. No one appears to know their origin. They are indigenous to the soil, climate, and locality in which they are bred; but, if removed to new pastures, they deteriorate, and gradually lose their typical form. For example, the Southdown bred on the Cotswold Hills is a very different sheep from its congener, reared on the native downs around Brighton. Again, the Lincoln, though beautifully adapted to the bleak wolds and fen lands of Lincolnshire, if removed to the downs of Hampshire, or to the

mountains of Wales, will soon change its type. How much greater then is this change likely to be, and how much more rapidly brought about, in a breed taken from a bleak, cold district of England, and subjected to the varied climatic influences of Victoria? There can, I think, be no doubt but that the heavy, coarse-woolled Lincoln, or the somewhat lighter-fleeced Leicester, will, in this genial clime assume a new form in accordance with local conditions, if bred sufficiently long, without any infusion of imported blood. Indeed the Leicester, as we shall hereafter see, already exhibits signs of change.

We should not, then, place too great reliance in any one English breed, or assume that, because it thrives well and is eminently suited to its native pastures, it will succeed equally well under new and altered conditions. The question will then be asked, where are we to seek a sheep, which shall, in every particular, supply our wants? The reply, I think, is simple. To obtain a breed of sheep to suit the climate, soil, and pasturage of this country, we must do as others have done before us; we must develop it. And if we cannot, by careful selection and rigorous weeding, produce it from any one pure type, then we must obtain it by a judicious infusion of two or more kinds. But there are persons who maintain that a desirable breed of sheep cannot be produced by crossing, no matter how carefully or systematically the work may be undertaken. Yet how contradictory this seems when we have so many well-marked instances on record. What is the Oxford Down but a cross between the Cotswold and the Hampshire Down, or the Border Leicester but a cross between the Cheviot and the Leicester, or the improved Lincoln but a cross between the old ungainly sheep of Lincolnshire and the Leicester of Bakewell? Indeed, so advantageous has Leicester blood been found in improving this last named race, that, in some instances, it is difficult to discern any trace of the original sheep in the improved stock. If, then, the crossing of distinct races has been so thoroughly and so satisfactorily effected in England, surely the same can be done in Victoria. Unquestionably there are among those enlightened farmers, who have latterly partly laid aside the plough for the breeding of sheep, men who will be able, if they set themselves the task, to produce, by careful selection from some pure type easily procurable in their district or elsewhere in the colony, or by the judicious blending of two or more kinds, a breed admirably adapted to local circumstances. But every man is not destined to become a breeder, that is, an improver of a race of sheep. Probably not one man in a thousand has accuracy of eye and judgment, sufficient to make an eminent breeder. But he, who does possess these qualifications, is

able, by careful selection, to modify and remodel the frame of an animal almost as readily as a tailor modifies his cut in accordance with the ever-changing fashions. In short, the principles of breeding are now so well understood, and the details so efficiently applied in practice, that we may obtain our stock to order, much in the same manner as we do any other commodity. Lord Somerville, speaking of what breeders have done for sheep, remarks—"It would seem as if they had chalked out upon a wall a form perfect in itself, and then had given it existence." *

But let us pass rapidly in review some of the more important breeds, with a view to ascertain which of them it will be most desirable to select as a basis for future operations. First in order is the Merino. True, I have already condemned it as a farmer's sheep; nevertheless it does not follow that the race is an undesirable one for crossing with some of the long-woolled breeds. Experience, indeed, has taught us the contrary. Take, for example, the three-quarter and seven-eighths bred sheep sold at the late Thomas Austin's sale at Barwon Park. These were, perhaps, the cheapest and most useful lots disposed of. The quality of the Merino fleece unquestionably is of the first order, but, like all other good things, there is not sufficient of it. The carcase of this breed, however, is miserably deficient; but this point may be much improved by a cross with the Leicester or some other large-framed, symmetrical, long-woolled breed; whereas simultaneously the fleece may be considerably increased in weight without being much deteriorated in quality. But it is the modification of the long-woolled breeds of Britain, or the crossing of these with the Merino, upon which we must chiefly depend for the production of a breed or breeds, to suit local conditions and supply local wants.

Before entering upon a description of the several breeds of long-woolled sheep, I may mention that I propose to take the Leicester as my type, since this breed is more widely diffused, and has played a more prominent part in the improvement of other races than any of its congeners. Indeed, with the exception of the Cotswold, and the Cheviot in its pure state, all the modern breeds have been modified more or less by an infusion of Leicester blood. Strictly speaking, the Leicester, Costwold, Lincoln, and Romney Marsh are the only breeds included under the head "long-wools." The Cheviot belongs more to the middle than to the long-woolled breeds; and the so-called Border Leicester—a cross between the Cheviot and the improved Leicester—is also, in point of fleece, more nearly allied to the middle, than to the long-woolled varieties.

* Darwin, "Origin of Species." 5th Edit., p. 33.

The Leicester, for compactness of form, fineness of bone, perfection of symmetry, and meat-producing qualities, is unsurpassed, if equalled, by any other breed. Its chief characteristics are extreme docility, great aptitude to fatten, and the early age at which it comes to maturity. The principal distinctive features of the breed are the small, slightly-elongated head, covered with short, white, silky hair, but with a total absence of wool; the long, thin, well-placed ear; the full and prominent, yet quiet, eye, standing, deer-like, rather beyond the general outline of the head; the fine, clean, well-formed jaws; the wide nostrils, capable of being considerably dilated when the animal is excited; and the jet black nose; the full, but tapering, neck, well-woolled to the setting-on of the head; the wide, deep, and slightly prominent chest; the straight, flat, and uniformly broad back; the well-developed hind quarters; the full, well-placed shoulder; the well-arched ribs; the fine, compact limb bones; and the long, soft, curly, but freely-opening fleece, weighing, on an average, from six to seven pounds. The fleece of the Leicester, however, is not sufficiently charged with yolk to protect it against the climatic changes and the hot sun of Victoria; it becomes dry and fuzzy, which circumstance materially reduces the value of the Leicester as a desirable sheep for this country. Crossed, however, with the Merino it has produced satisfactory results.

The Lincoln promises to be a valuable breed for the rich pastures in our cool districts; but the high prices realised for rams of this breed, places them, in some measure, beyond the reach of farmers, except it be those who purpose to establish a stud flock, and thus can afford to purchase the best animals procurable. The breed is the largest framed and heaviest fleeced of all the British races. At one time Lincolns were large, ungainly animals, clothed with an immense fleece of long, coarse wool, but of late years the breed has been much improved by a judicious infusion of Leicester blood; in fact, it may be now regarded as a sub-variety of the Leicester. In general symmetry the Lincoln is inferior to the Leicester, but in point of fleece, both as regards lustre and length of staple, it is superior to the last-named race. The chief distinctive features of the breed are the coarse, angular head ; the peculiar conformation of the muzzle, giving young sheep not unfrequently the appearance of broken-mouthed ewes; the short, fuzzy wool on the poll, which oftentimes extends to the sides of the face; the coarse limb bones; and the tendency to flatsidedness. But all of the above defects are gradually being wiped out by judicious selection and careful breeding. The Lincoln is a gross feeder, and can, therefore, only be profitably reared on rich pastures, where it has not far to travel for its food.

So far as our limited experience permits an expression of opinion, this breed makes a most desirable cross with the Merino; and it will probably be found that a cross of these two races will furnish the right animal for the farmer in the cool and fertile districts of the colony.

The Cotswold, though better adapted than any other breed to its native hills, does not meet with much favor in this country. It is a large, handsome sheep, and grows a heavy fleece of coarse wool. The most distinctive features of the breed are the bold top-knot, which often hangs down over the face; and the deep, wide, and prominent chest. Crossed with the Merino, it has yielded only meagre results; and it would appear that it is generally an undesirable breed for this country. The cause is difficult to find, but it probably lies in the fact that the soils of its native hills contain, on an average, from 80 to 85 per cent. of lime; whereas the soils of this country are singularly deficient in that ingredient.

The Romney Marsh is a coarse-woolled breed, resembling the Lincoln very closely in general symmetry. The chief virtue of this breed lies in its power of resisting fluke. Mr. W. Lyall, of Western Port, who has experimented with most of the English breeds, gives it as his opinion that, of all the breeds, the Romney Marsh suffers least from fluke.

The Cheviot is a hardy sheep, capable of enduring great privation. It is destitute of horns in both sexes; its head resembles closely that of the Leicester; the legs and face are white, though there are strains in which these are mottled with grey; and it exhibits a tendency to lightness in the fore quarter. The fleece of the Cheviot weighs from three to four pounds, and is singularly deficient in yolk. The breed has not been much cultivated in Victoria.

The Border Leicester differs from the last-named breed chiefly in the improved character of its fleece, but it does not equal the pure Leicester in this particular. Sheep of this strain have not unfrequently been imported into this country and passed muster for the pure article.

There are some important British breeds yet unnamed—the several Down breeds. Of these the principal ones are the Sussex, Hampshire, and Shropshire Downs, but they are all of little account as farmers' sheep, and so may be passed over without further comment.

Now let us pass on to consider which of the above-described breeds, or a modification of which of them, or a cross of which with the Merino, or other breed, will be likely to give us the right farmers' sheep for this country. In the outset, I may mention that I am in favor of a modification of some pure sheep, if, by watching the changes which it threatens to undergo, when subjected to altered conditions of life and careful

selection, we can produce a desirable variety. It is easier to preserve an existing character or to modify an existing form than to create a new one. However, should all attempts in this direction fail, then we must have recourse to cross-breeding as the only alternative; and most assuredly we shall be able, by one of these two methods, to establish a breed in every way adapted to our wants; and further, it is probable that a breed will be formed in each district which will be beautifully adapted to that locality, but which, if removed to another, having a different soil and pasturage, will thrive no better than does the Lincoln if removed to the downs of the south.

Of all the British breeds, the Lincoln, perhaps, bids fairest to prove the right sheep for our agricultural lands. It takes kindly to the climate, and seems to undergo a gradual, but not deleterious, change (as was noticeable in the flock of the late Mr. Thomas Austin when brought under the hammer), which, if carefully preserved by selection, might result in the founding of a breed in every way suited to our wants. The Leicester fleece under the influences of the Victorian climate exhibits, as has been already observed, a marked change for the worse, and this detracts greatly from its value as a sheep for this country. The Cotswold is of little value apparently; the Cheviot has not been much tried; the Romney Marsh is proving itself a useful sheep on low land, and is likely to turn out the best breed for resisting fluke; while the Border Leicester, like the pure-bred sheep, exhibits a tendency to degenerate in this climate. But some of the above, more particularly the Lincoln and the Leicester, cross admirably with the Merino; and our farmers will probably have to depend chiefly on crosses of these for the development of a serviceable breed. The pure-bred long-wools are still too expensive to render them profitable when kept in small lots, unless for stud purposes. It may remunerate a large sheep-owner to purchase a few high-classed long-woolled rams to put to his flock, but it will surely never pay the man who may possess, say, 150 or fewer ewes, to give from £35 to £50 apiece for rams. The man who desires to possess a sheep of the right sort will have to begin at the beginning and work upwards. Let him select, according to his grazing capabilities, a number of large well-framed Merino ewes, and put to them the best bred Lincoln or Leicester ram he can procure, selected from some good flock, and if he will then pay proper attention to culling, and not use one of his cross-bred rams until a new type has been firmly established in his flock, he will not be likely to get far wrong in his undertaking.

The advent of sheep-breeding on farms is an event to be hailed with

much satisfaction, and will create a new era in the annals of Victorian agriculture. Moreover, the time is most opportune. The high prices ruling for wool, and the greater facilities for conveying animal food to the densely populated centres of Europe being daily brought to light, tend to enhance the value of live stock, more particularly sheep; and this change in our farm system will doubtless teach farmers the old maxim—"Cultivate less land and grow more corn."

APPENDIX B.

MEAT PRESERVING.

BY THE REV. J. I. BLEASDALE, D.D.

Alles kommt mit der Zeit, and time has now at length brought to Victoria what for years past was a crying need—a Department of Agriculture under a responsible Minister of the Crown. And as no such department in a new country can be complete without starting from points up to which the best previous records could be made of the various branches and sub-branches of agriculture, it occurred to me, when responding to the invitation of the Honorable the Minister of Agriculture, to furnish such information on Victorian industries as has fallen in my way to observe or study, that the first thing needed was to draw a line about the end of the present financial year 1872–3. In furnishing essays on one or two matters upon which I have spent a considerable portion of my leisure time, I have kept this in view; and, though the present paper carries experiment beyond the middle of 1873, it would be incomplete without the latest details on this, at present, most important Colonial Industry.

In the present paper I propose to give, as succinctly as I can, an account of meat preserving in these colonies, but chiefly in Victoria, and in more detail the plan of Mr. Harrison, by which it is morally certain that fresh Australian beef and mutton can henceforth be placed before the inhabitants of Great Britain as fresh and as good as any they can purchase in the shambles, or from their ordinary butcher.

The earliest known pioneer of this sub-branch of agriculture in these colonies is Sizar Elliott, Esq., J.P., formerly of Sydney, New South Wales, now residing near Melbourne. In 1845–6 this public-spirited colonist was at work, introducing, to the extent of his ability, what twenty-seven years afterwards has become one of Victoria's

recognized sources of wealth—preserving meat by what is now known as the "*tinning process.*"

When I first landed in Melbourne, early in 1851, the boiling-down of sheep and cattle for their fat was at its height. Whole hecatombs were slaughtered at the Saltwater River for their fat alone. The residue — bones, flesh, &c. — was seldom turned to any economical account, but buried or disposed of as best they might be. At that time, such was the state of society in Melbourne, that one could hardly take a more effectual means of insulting a Victorian resident than by asking him to dine at a table, where a leg of the finest mutton formed one of the principal joints!

To men like myself, fresh from a country, where millions of human beings were starving for want of that, which here was mere *refuse*, this prodigal waste of food was, to say the least, a subject for serious meditation and deep regret. And though Mr. Elliott's experiments, which amounted to demonstrations, were well known through the press and otherwise, yet I could hear of no one, who would invest a shilling in an enterprise, which at that time promised the best of returns. Mr. Elliott, in introducing his remarks on the efforts he made at Sydney so far back as 1845-6, states with force and truth how he got on, what sort of encouragement he met with, the practical success he achieved in preserving meat, fish, and vegetables quite free from salt—concerning which I can aver that I ate some of these tinned meats full twenty years old, then in splendid preservation — and how prejudice and ignorance, and want of public appreciation, kept this valuable industry back, and for years, and for many years utterly extinguished all hopes of its being revived in New South Wales, or introduced into Victoria. But it is only just that Mr. Elliott should tell his own story in his own way:—

"Few of the present generation can rightly understand the character and composition of general society in the neighboring colony thirty to forty years since, and hence the difficulties then experienced in the introduction of new articles of commerce into use cannot now be fully appreciated. I may premise, that my own trifling efforts were wholly unaided by outward help, and the advancement of my adopted country was my sole end and aim.

"The industry with which my name is mostly identified, though not the first introduced, is that of preserved meats. To make the reader rightly appreciate why my thoughts were first turned to this subject, he must be made aware of the fact that the pastoral interest was then at the head and front of all progress in the colony, and its depression or prosperity was felt through all the arteries of trade.

"In the year 1845-6 this interest was in so low a condition that general ruin stared the whole country in the face. Sheep in millions changed hands at 1s. each, and cattle in thousands at 20s. per head. In this deplorable state of things, a

gentleman named O'Brien conceived the idea of boiling down a few sheep solely for their fat. The first attempt to carry out this idea was attended with success, and, after some further experiments, sheep advanced to 5s. each. The result was, that in six months' time some hundreds of thousands of sheep were thus slaughtered for their fat. It was this vast destruction of animal life which turned my attention to utilising the *lean* of the fat sheep. Knowing, as I did, that in the old country meat was preserved in tins, the idea struck me that the same thing could be done in the new. A few tins of meat were first cooked by the kitchen fire, but without success. A further quantity were then boiled in strong brine, and these gave some indications of keeping, but they decayed in time. At this period I procured an old copy of Ure's *Chemical Dictionary*, in which there were a few lines on the subject, and this information convinced me that a greater degree of heat was wanted in the cooking process; but the question was, how was this to be obtained? Chloride of calcium was then unknown, at least to me, and while looking for some liquid with which to get an increase of temperature, I thought of oil. My next attempts were alternately successes and failures. I now cooked my meats in a pan of whale oil, and my tins of provisions kept sound.

"My first public exhibition of meats was at an exhibition of articles of commerce, held 30th September 1846, the judges being R. Lynd and Rev. G. Turner, and the award was as follows:—

"'S. Elliott—Preserved Meat, Fish, and Vegetables—Second-class Prize.'
"*Extract from 'Australasian,' 30th September* 1846.

"'Preserved mackerel, beef, and carrots, in tins, by Mr. S. Elliott, of colonial produce notoriety.—These articles promise well; but having been only twenty-two days made, it would not be right to express a decided opinion as to the success of the experiment. A second-class prize was awarded by the judges.'

"At this period I erected for myself a small factory, and continued from day to day to gain fresh knowledge and experience. My pan and boilers were heated by gas; the oil answered well, but I found that I was using a commodity the extreme danger of which I did not fully know.

"On one occasion, whilst cooking my tins after being sealed, I neglected to consult the thermometer, and the placid oil gave no symptoms of its great heat, when suddenly an explosion took place, scattering the scalding oil far and wide. The heat, in fact, had melted the solder, and the tins burst open from inward pressure, and hence the disaster. Fortunately I was at the remote end of the room, and thus escaped with life, or at least from severe injury. I then shelved a small room, and by placing the bottom of the tins outwards, and using a charcoal fire I kept the temperature to what I considered the average heat of a ship's hold under the equator. Tins of meat which would not stand this test were at once discarded. I never knew a single tin to turn out badly after this trial. During this time I altered the character and shape of the tins several times. The first tins had a round hole punched in the top, sufficiently large to admit a funnel for the supply of stock after partial cooking; a small cover was then soldered over it. This plan was not found to work well, and was discontinued. The second plan was the one now adopted at all our meat factories, namely, having the cover in one piece, and after filling soldered down, leaving only a small opening for steam to escape. The third plan was a more interesting one, and was largely adopted subsequently. Inserted in the cover was a soft metal tube about the size of a

large goose quill, of about 18 inches in length; this was kept from choking while in the cooking-pan by occasionally inserting a wire down it. The appearance of the pan, with its tins and its hundred little chimneys, all giving off steam, used to surprise my visitors. When the cooking was completed each tin in turn was seized by its chimney, lifted from the pan, the tube bent by the fingers into the shape of a syphon, the long leg being inserted into a pan of boiling stock (strong gravy). A little cold water then applied to the cover, the steam inside, being condensed, formed a vacuum, the syphon immediately acted, the gravy which had boiled out of the tin was restored, and the package was again full weight. A pair of nipping pincers was next applied, cut off by another pair, and finally soldered, leaving only a small knob on the top. The tin was then ready for the testing room.

"At the next public exhibition I was awarded a first-class medal. The following extract is taken from the *Sydney Morning Herald* of 24th February 1847:—

"'A sample of preserved meat by Mr. Sizar Elliott, obtained a prize. The article was good, but would have borne a taste more seasoning.'

"*Extract from a Speech of C. Cowper, Esq., M.C. (now Sir C. Cowper, Agent-General for New South Wales), at a meeting of the West Cumberland Agricultural Society, 3rd March* 1847.

"'With reference to the preserved meat, the judges had given a most favorable opinion; and a very old voyager, and one who had considerable experience in testing the quality of the article, pronounced it most excellent.'

"In October of same year the following certificate was presented to me by seven ship-masters:—

"'These are to certify that we, the undersigned masters of ships now lying in Port Jackson, did this day, at the request of Mr. S. Elliott, select from the stock in his store, for the purpose of trying their quality, one tin of each of the following descriptions of preserved fresh provisions, said to be of his manufacture, viz.:—

Beef and vegetables, Lamb and green peas,
Mutton and vegetables, Ox-tail soup,

and having amply tested the same, do pronounce them to be fully equal to any article of the kind that has come under our notice. We therefore with confidence recommend them to ship-masters or other persons requiring this description of stores. A tin of beef suet was also opened, and found to be fresh and sweet.

"'Dated at Sydney this 25th day of October 1847.'

"In December following another certificate of similar character was presented to me, signed by five ship-masters.

"The object of giving the above certificate is to show that the manufacture was carried on in commercial quantities, and not for amusement only.

"In March 1848 I was again awarded a first-class prize for preserved fowl.

"Having now established the industry, the great drawback was the want of support from the general public. The colonial merchant was too much interested in importing for the market. The English captain would not look at anything made in the colony. None but captains of American men-of-war, American whalers, and a few others, could be induced to take the meats, or in any way patronise the industry. However, the trial had convinced others that this is the proper country for carrying on the new industry, and when it was taken up by persons with means sufficient to ship the product to England, my object was completed. At the breaking-up of my establishment I reserved a few tins of meat for domestic use.

One of these I opened before a large meeting of members of the Philosophical Society, Melbourne, October 1857, and at the same time I read a paper on the 'Preservation of Animal Substances.'

"In 1866–7 I opened my last tin, then twenty years old, at the International Exhibition, and I received the bronze medal and many complimentary remarks from the jurors.—(See Report, Class 2, Section 5, page 197.) The above facts will, I trust, secure for me the proud position of being the pioneer of this industry in these colonies. Yet, upon reference to the decision of the Council of Chairmen of Jurors of Australian Exhibits (see *Argus* of 10th June 1867), the Australian Meat Company on the Clarence River was awarded a silver medal for preserved meat as a *new industry*. Now this company was formed in 1865, or just nineteen years after my first exhibits. I may reasonably ask if this is fair? I shall endeavor at the forthcoming meeting of the Royal Commissioners to have this rectified.

"The knowledge I had gained enabled me many years after, when a member of the Burke and Wills exploring expedition, to superintend the *ghee* required for the expedition, which so well stood the test of a hot climate, while the charque, or dried beef, prepared by an inexperienced man, became putrid before the first month had expired.

"The first to follow me in manufacturing was Mr. M. Joseph, of Camperdown near Sydney. In 1848, Mr. Henry Dangar started a factory at Newcastle. Having visited both factories, I should judge they were equal in capacity for manufacturing purposes, and both firms shipped largely to Europe."

Still the efforts of Mr. S. Elliott and a few others came to little, if anything, beyond the demonstration that good meat could be prepared in these colonies; but it is plain that the industry never became a commercial success. The theory adopted, and the success as an experiment, are beyond all doubt; and the pioneers, to the extent of overcoming the first obstacles, deserve praise. Yet when Mr. Elliott claims to be the introducer of a "new industry" into Australia or even New South Wales, it must be remembered that the *introducer* of an industry is in a very different relation to the mercantile interests of the country from that of the successful experimentalist, or the ingenious *discoverer* of the laws and conditions, under which certain results may be obtained. The introducer of a new industry, whether he be the discoverer of the laws and conditions of its action or not, is really he who works it into a lasting commercial success.

At any rate until the Intercolonial Exhibition 1866–7, little or nothing was known, even to the privileged few, of the process of preparing fresh meat in tins, beyond a paper read by Mr. S. Elliott before the Royal Society of Victoria, which was interesting in itself, and rendered more so still by the exhibition of tins of meat put up in Sydney in 1848. In the Exhibition 1866–7 there were some tins of the same preserves as above mentioned by Mr. Elliott; a few prepared by Mr. McCracken, in 1861, then of Hobart Town, Tasmania; and about a

dozen 6-lb. tins from the Australian Meat-preserving Company, Clarence River, New South Wales. Of other preserves there was one of soup, put up in skins, solid, firm, and dry, by Mr. Whitehead, of Mossman's Bay, Sydney, that merited the highest praise; still at that time (1866–7) not one of these could be called an established industry in any of these colonies.

The Royal Commissioners for the Intercolonial Exhibition 1866–7 exerted themselves vigorously to bring these preserves to the knowledge of the public, and were ably supported by the press.

The beef and mutton, preserved by the Clarence River Company, was the best of its kind seen by the meat jury of the Exhibition up to that date. It possessed a novel interest from the way in which the cooking had been carried out. An effort, apparently successful, in our then state of information, had been made to distribute the heat equally through the vessel containing the meat, by inserting a perforated tin cylinder of one inch diameter through the whole length of the centre of the meat, so as to collect the juices, and do all that seemed possible to equalize temperature. The opinion of competent persons was that the meat was sweet and toothsome, but over-cooked. Mr. McCracken's small exhibit was better even than the above in many points.

About the close of the Exhibition in 1867, or not long after, Mr. S. Ritchie, now for some years manager of the Melbourne Meat-preserving Company, sent to me a few tins of meat recently prepared in Melbourne, and also some which he had cooked on the Danube in 1855, that quite eclipsed anything before seen here as preserved meat, in that form.

From that date (1867–8) first one or two and then many meat-preserving factories sprang up in Victoria, and the industry of preserving meat by the "tinning" process was *introduced.*

There have been many attempts to introduce variations into the process, such as previously dipping the flesh, to be packed in the tins, before cooking, in boiling water, with or without a little salt; filling the tins, when the raw meat had been put in, with strong gravy, got from boiling down the bones and adhering flesh; corning, more or less, &c. Of course, those are matters of detail; but the real difference, apart from judgment and skill in manipulation, lies in the fact that the best preserved meat is now, and will be found to be, that which is taken from full-grown or even old cattle, and which have been killed as near to the place where they were fed as possible—the nearer the better.

That "tinning" meat is now an established industry in Victoria is beyond all doubt. And for both exportation and home consumption there is no fear that it will die out.

ON PRESERVED MEATS: ESPECIALLY WITH REFERENCE TO MR. JAMES HARRISON'S METHOD OF FREEZING MEAT.

First Study.

The Exhibition just closed in Melbourne brought together samples of "tinned meat" from nearly, if not quite, all the Victorian establishments, which afforded the experts abundant opportunity for judging of their quality. The variety also was extensive, and included several kinds of game. Legs of mutton and rounds of beef, slightly salted, were among the exhibits. Soups ready prepared, and needing only to be heated, were very numerous.

Yet, notwithstanding the excellence of meat preserved by the "tinning process," there has been, and still is, a backwardness among the laboring classes of Great Britain to receive them into general consumption. And the old problem still comes up, "How are we to preserve meat fresh by the carcase, and deliver it in such a state in British seaports as to admit of its being kept in suitable chambers on arrival till required, and distributed over the inland districts?"

The following pages contain the details of experiments made, facts established, and the method, by which the results have been attained.

"Frozen meat" is known familiarly enough to residents in high latitudes, and also to many hundreds in this city, whom business or pleasure have caused to travel in ships trading from North American ports to the West Indies. From not a few of these I obtained information regarding the way in which this meat, fish, game, or fowl was preserved; and all agreed that it was thrown promiscuously into the ice compartment of the vessel, and nothing else done to it. One or two seafaring gentlemen asked with surprise, "What more could be done to it?" All I heard confirmed the few personal observations I had made many years ago in London, in the instance of American frozen pork, viz., that it must be thawed by being placed in cold water, and then cooked without delay, no matter what kind of meat, fish, or fowl it may be, or it will become flabby and rapidly pass into decay.

Among others, whose opinions I sought, was Mr. Cosmo Newbery, scientific superintendent of the Industrial and Technological Museum. To my regret he was absent during the time the experiments were conducted, it being the Christmas holiday season; but on his return I obtained from him as much as is known about American frozen meat, and this substantially confirms the opinions of others; and he also added what I had not heard of before, viz., that the red flesh of deer and bear

became short and brittle in the fibre, and perceptibly softer than it should be when cooked.

It will readily occur to any one who has turned his attention to processes of refrigeration, and is acquainted with the nature of albuminous and gaseous matters, that mere ice will never effect much more than a *superficial* freezing of bodies holding them in solution; in other words, ice will abstract the caloric out of thick pieces of animal matter, placed in contact with or near it, only to a little depth below the surface. Consequently, meat thrown into the ice-house of a ship, or other like receptacle, will be and will remain frozen at the outside quite sufficiently to hold elements of ferment and putrescence, such as albumen, from being altered to any appreciable extent, and the gaseous bodies from escaping, or effecting new forms of combination. But in every instance, where the meat has been but superficially frozen, when once the ice casing, so to speak, has been removed, the albumen and those hitherto arrested gases are ready to rise in rebellion, especially on the access of atmospheric air; and the rapidity with which they avail themselves of the chance has not been exaggerated in the instances related to me of American frozen meat.

In regard to flesh meat frozen for a long time, and kept at a temperature many degrees below the freezing point, I consider it more than probable that either in the freezing or thawing, or partly in both, there would be considerable breaking up of the fibrous structure of the meat. This however does not occur, as will be shown, when the freezing has been conducted at a temperature below the freezing point of 10° to 15° Fahrenheit.

Up to this time our knowledge of the methods of preserving fresh meat had gone no further than what I have described, and, viewed in an economic light, could not be availed of by Victorians. But supposing it possible to land a cargo in a British port, how could it be distributed through the country in any but about two months of the coldest weather?

With meat at famine prices in England, and ice and fish and flesh without limit in North America—no very great distance to travel, and no warm seas to cross—it might well be a subject of wonder why so little should have been attempted to meet the demand by a nation thrifty and inventive above all others, and continually on the look-out for profitable markets. The explanation may lie in the practical experience gained in every-day life, that the iced-meat would not "do."

If it were my object to write a detailed account of what has come to my knowledge of attempts to preserve meat by the carcase in ice, or

in some gaseous preparation, I should refer at length to the extensive and extremely expensive efforts of T. S. Mort, Esq., of Sydney, all of which, after an expenditure of perhaps £10,000, have as yet come to nothing—at least, nothing certain has been made public.

Four or five years ago I began, at the instance of the late Hon. J. H. Plunkett, of Sydney, to examine certain samples of essence of meat, prepared on Baron Liebig's plan by a Sydney firm, and at the same time also a sample of soup, put up in a portable form by Mr. Whitehead, of Mossman's Bay, Sydney, the best of its kind I ever met with, and one deserving of all commendation. My processes and observations, by the way, soon showed me that I must direct my attention to find out what particular substance or substances first commence to *ferment* or decay, and become the source of organic change in the rest of the flesh. I found it to start with what cooks call pot-scum, in reality albuminous matters, and next after them blood and fibrine. The details of these and some similar investigations were laid before the Medical Society of Victoria, and discussed by that large body of learned men, for the benefit of the preservers of meat by what is now universally known as the "tinning process," and published in the *Medical Journal*. All that I then and since acquired threw light, as I thought, on the unsuitability of the freezing process, and, taken along with the experience of the North American frozen meat, made me extremely sceptical about Mr. Harrison's recent experiment on a comparatively great scale—great both as to the variety and quantity of flesh, and also as to the magnitude of the pieces operated upon. These consisted of quarters of beef and halves of large sheep, upon which no grain of salt had been put.

The preserving-house had been erected under Mr. Harrison's directions, in a rough, but substantial way, of common deal boards, in the very hottest portion of an unlined iron building. At the end of twenty-five days this place was opened in my presence, and the half of a large sheep—fat, kidney, and all complete—taken out and examined.

Of course my curiosity was thoroughly aroused, for I saw plainly that one of two problems in this most important concern was on the point of being solved. But I hardly anticipated that I should have almost an exemplification of the American ice meat-preserving alongside of Mr. Harrison's plan. But so it was. Whether he had thought about it beforehand or not I did not ascertain, but at any rate, at the last moment of closing the place, he put in the half of a large sheep, not previously frozen, and though not exactly in the freezing vessel proper, yet near enough to be kept as a piece of meat necessarily would be when flung

promiscuously into the ice-chamber of a ship, and lying on the top of other meat, if not in contact with the ice itself.

Now this meat was just frozen on the outer surface and no more. The insertion of a penknife-blade near the kidney about an inch deep drew a small quantity of a fluid colored by blood; and when, five hours afterwards, the raw loin or middle portion was placed before the experts, it had acquired a perceptibly musty, mawkish smell, and the lean flesh felt soft and flabby to the touch. An hour afterwards the leg, previously thawed in cold water, and then roasted, was found perfectly good. Here we had an exact exemplification of the American meat; and to confirm it, the neck-piece, after the shoulder had been removed, turned quite bad, and had to be buried in less than twenty hours. Naturally I began to fear deeply that we were yet in our former difficulty about distributing the meat, even if it got home sound.

I had a piece of beef 14 or 15 lbs. weight cut off the next lump that was taken out. The whole might have weighed 60 or 70 lbs. It was all that an experimenter could desire, being from between the loin and rump, and for the size of the piece presented a more than average surface to the air, and not too much fat. I caused this piece, and a corresponding lump, fresh from the butcher, to be hung up in a corridor close to my office in the Exhibition buildings, with a thermometer midway between them. During the whole period of the first experiment it ranged from 63 degrees to 68 degrees Fahrenheit. Other portions of this beef were thawed in the orthodox way, in cold water, and cooked in the oven, and found quite equal to newly-killed beef, of good quality, full of gravy, and rather tough, as new meat usually is.

At the expiration of twenty-four hours (11 a.m. Christmas morning) I called the officer in charge of that division of Exhibition work, a very intelligent man, and he took down the meat, and reported the thermometer at 67 degrees. Not without some misgivings, I cut off a steak of about 24 ozs., and ordered it to be cooked in the ordinary way for breakfast.

While the cooking was in progress, it occurred to me to try the then temperature of the lump, and, having some good thermometers at hand, I inserted one in the lump and left another in contact with its outer surface. Even then they both indicated what I should have expected if the meat had been ice, certainly not what I then anticipated. The inserted one indicated temperature of ordinary ice (32 degrees), and the one on the outer surface that of ice passing into thaw, rather lower than the other.

Now, for the first time, I began to hit upon the difference between Mr. Harrison's work and the American practice.

The meat was cooked, and the officer and I made an excellent Christmas breakfast off it. The lump was suspended again in the same place, and the fresh meat examined; but, beyond the slight bleaching of the fat and blackening of the lean, there was nothing worthy of remark.

About 10 p.m. of Christmas Day, when this lump had been thirty-five hours out of the ice, it was re-examined in presence of several ladies and gentlemen, and found to be not only perfectly sweet, but assuming the ordinary characteristics of kept meat. The fresh butcher-meat, hanging not six feet from it, had turned sour, and was beginning to show signs of greenness, and, in order that it might not be lost, was given to the housekeeper to cook.

I then began to think there was no further use in following up the investigation, for if meat would keep so long in a temperature of 68 degrees, it would, on arriving in a British port, have a fairer chance than that newly killed. So thenceforth the remainder of the piece was let hang, and every six or seven hours re-examined to see if it had become tainted. But what was my utter astonishment when the remnant, say about 5 lbs., was directed to be cooked, and found when served up to be excellent. Dr. McCrea, the Chief Medical Officer, Dr. Gillbee, and myself partook of it. The Chief Medical Officer dined off it, Dr. Gillbee lunched off it, and I carved it, and tasted both the meat and the gravy. Now this was at least seventy-five hours after I first hung it up.

Intelligent persons will admit that here were fresh materials enough to excite the interest of an experimenter. Here were the most precious of all materials — well-ascertained facts. So I then gathered up all that I knew of animal matters, and, in my humble way, went into the causes.

It now became evident that there are agencies at work rendering meat preserved in the same way as was this by Mr. James Harrison available in large quantities, and equal, if not superior, to any ordinary freshly-killed meat exposed in the shambles, and capable of being distributed over the inland towns of Great Britain.

As in a most important matter like this it may prove interesting, I would briefly record the observations I have been able to make since I commenced inquiring into these "agencies" or causes, that others following me may correct my errors, or add to the general information upon the cheap preservation of fresh meat on the large scale. Even Mr. James Harrison said he had learned *something fresh* while conducting this experiment; and surely no one among us can claim to know as much about refrigerants as the discoverer of the process of making artificial ice reasonably cheap.

The *meat*, as such, the albumen, fibrine, blood (if any), are not frozen; only *the water* which renders such bodies fluid or moist passes into ice. In our instance the whole of this water had become ice. In a science point of view, it became extremely interesting to learn what became of this water when the thaw took place. Did it gradually drip out as the change took place, and fall on the ground? or did it resume its normal position in relation with the bodies above enumerated?

I obtained for the purpose of this investigation a large fore-quarter of the "frozen mutton," and suspended it, after removing a piece, in the corridor above mentioned, and beneath it a vessel to receive anything that might drip down. When the piece was completely thawed (temperature 66 degrees), I found about three-fourths of a wine-glass of water, slightly colored. On being evaporated, only a very minute quantity of animal matter was found, the water being, as one might anticipate, that deposited from the atmosphere on the cold surface of the joint. Consequently, there was some ground for assuming that the actual water of the meat returned slowly, as the thaw took place, to its normal condition in the flesh. Such experiments as obtaining the juices from the raw flesh after thawing appear to render this important point all but a certainty. How much this has to do with arrestment of gases, and prevention of decay when the thawing is complete, I hardly venture to say, but, no doubt, it has important influence. Certainly the gravy of the meat, when cooked, differed in nothing from that of fresh meat. I am not aware if any one but myself has boiled any of this meat. While I was testing this point of the condition of the fluids, I cut through a thick leg of mutton, and had one piece of it boiled; and I watched the rise of the pot-scum (the albumen) at its proper temperature, about 178 degrees, and then the fibrine and blood, at 201 degrees, when each put in its appearance at the proper time. The boiled piece was preferred to the other, which had been roasted, by some competent judges. I assume, then, that the natural juices are found in the thawed meat in their normal condition, and that the British consumer, when he gets it, will not have to complain of dryness and want of gravy! *

The above detailed experiments were repeated over and over again with like results.

To those who may think proper to criticise these observations from the theoretical point of view—the expansion and contraction of water in freezing and thawing—exemplified in the bursting of water-pipes, &c., I would just say that there is no analogy whatever between the bursting of a rigid body like a water-pipe and the yielding of elastic substances

* The *colloid* substances had not been interfered with at all injuriously.

like the cells and fibres of meat. I have often had my shoes frozen, but can remember no instance in which the leather was made brittle or its substance broken up by either the freezing or the thawing.

The fact is, that by Harrison's process the meat is frozen to the bone; and bearing in mind what I have established by experiment, viz., that there is no waste of the natural juices of the meat, nor disintegration of its fibre, in the process of thawing, the joint is presented to the consumer in precisely the same condition as that in which it was when it left the butcher's shop.

The action of this *complete freezing* is to annihilate time and space, and to present the joint in a condition to keep like newly killed meat, with this advantage, that during the process of thawing of, say, 20 lbs. of any ordinary joint, an interval of twenty hours, at a temperature of 63 degrees Fahrenheit, must elapse. When completely thawed, and on attaining the ordinary temperature of the air, it will start on its course of keeping on a level with a fresh joint from the shambles.

On the fortieth day after the meat had been first placed in the preserving-room, Mr. Harrison directed the remainder, a number of very large pieces, some of 40 lbs. or 50 lbs. weight and upwards, to be cooked, and, on successive days, given in the refreshment-room to any one who might think well to lunch off it. The further prosecution of this most interesting and valuable discovery is in the hands of squatters, stock-owners, and merchants.

Perfect cleanliness and care in the bleeding and preparing the carcases for the freezing-house had been observed, and all reasonable precaution had been taken to keep it as clear as possible of any germs of decay that might be moving about in the air; and this is quite necessary.

When the whole water of flesh meat has been converted into ice, each lump nearly resembles a block of ice of that size; and, as I have pointed out already, thaws only at the outer surface at first, and very slowly afterwards on towards the centre. A block of ice never begins to thaw in the centre; and, as every one knows, if the water be allowed to drip completely away from it, so as to be no longer in contact with it, the thawing will go on proportionately slower. Just the same with this frozen meat; only the water in this instance gradually resumes its place among the *colloid* substances instead of dripping away.

Now, as regards the fitting up of any portion of the hold of a ship, and taking advantage of any cheap non-conductors of heat, all this is a matter for the ship's carpenter. But as regards the packing of the frozen meat, supposing it to have been frozen ready before being packed, the principle will be to render the whole quantity as nearly like one

solid block of ice as possible; because, just as the thaw commences only at the outside of the lump, so, if this whole chamber be made to resemble one solid block, the risk and expense are both diminished in proportion.

The cost of sending frozen meat, as compared with that of the "tinned," is a matter that I need not enter upon farther than to lay down the unit of calculation. It is this. There will be a certain loss on a cargo of 500 tons of ice brought from New York to Melbourne; that loss represents the amount of ice required to take to London or Liverpool 500 tons of frozen blocks of meat. The loss of ice on the meat cargo would not be quite so much. But this need not be gone into at present.

So far, I think, I have stated nothing which is not fairly borne out by ascertained facts. There are some other matters of detail, and quite secondary importance—such as the best, sweetest, and cheapest substances to be used as non-conductors of heat, ventilation, &c.—which present no obstacles to the success of this grand discovery. Mr. Harrison was awarded a gold medal for his successful experiment.

When I state that I believe there are in Australia very many millions of acres that will perhaps never be useful for anything but growing timber and feeding cattle; and that there are corresponding millions of ill-fed stomachs among our own countrymen at home craving for the fresh carcases of such cattle; any one will understand the interest with which I carried out the above investigations, and the pleasure I have in giving them publicity.

Note.—The following is Mr. Harrison's note furnished to the Royal Commissioners for the Catalogue:—"Harrison, James, 3 Earnbank terrace, Carlton. 639. Fresh meat, frozen and packed as if for a voyage, so that the refrigerating process may be continued for any required period. By this process, the inventor states, the hold of a ship can be filled with the carcases of sheep and cattle, which are frozen in the act of being stowed. The expense of freezing 500 tons before starting will be £100, and of keeping the cargo in a frozen state during a voyage of three months, £75; or seven shillings per ton in all."

Second Study.

At the close of the experiments just recorded, a number of gentlemen interested in pastoral pursuits took the value and importance of them into account, and in a short time subscribed a sum of £2500 to enable Mr. Harrison to prepare and take to London a parcel of from 20 to 25 tons, with a view of testing the thoroughness of the success of these experiments as a preserving process, and also the actual cost and probable economy of shipping meat in this manner rather than in the other—of cooking it here in tins.

In the former experiment some points of *economic* importance had not been fully attended to, because then the first consideration was *whether or not the meat would turn out well*, and what would be *its condition on and after* thawing, in ordinary air, and under conditions not very dissimilar from those to which it would be subjected in the warmer weather of an English summer.

Before, however, commencing preparations for the shipment, Mr. Harrison started another set of experiments, similar to the former, only on a somewhat smaller scale, in the same chamber as before, with a view to obtain as accurate data as possible regarding those matters of much economic importance just mentioned. Among them was the best *shape* of the meat-chamber, and that seems beyond doubt to be the *oval*, or nearly so; the daily waste of ice in relation to the quantity of meat to be kept frozen; and again, after how many days the quantity of waste per diem would become uniform, &c., for it is evident that more will be consumed in the early days than afterwards, because the non-conducting substances used need to be deprived of their normal heat.

On this occasion Mr. J. Cosmo Newbery, scientific superintendent of the Technological Museum, was associated with me, and we both were made privy to all the details of the process. I entered on this second study of the frozen meat with the more pleasure because it would enable me, in company with Mr. Newbery, to control my former experiments, even if it added nothing new to the facts already ascertained.

On 28th May, when the meat had laid four and a half weeks in the keeping chamber, it was opened at 11 a.m. in the presence of Lieut.-Colonel Stephens, Messrs. Hughes, Wilson, myself, several other gentlemen, and representatives of the press. The principal reasons for opening the chamber at the end of thirty-two days were, firstly, to check the results obtained by watching the daily amount of water thawed by the weight of the remaining unthawed ice; secondly, suppose that from any cause it should be necessary on the long voyage to open the chamber, what would be the effect—the loss in ice—under such a possible occurrence; thirdly, what became of the aqueous vapor admitted into the chamber in the process of its ventilation; and, fourthly, as I had conducted the first course of examination and study, as recorded above, I was naturally enough asked to carry out the second.

In regard to the first, 480 lbs. remained unthawed, and nearly corresponded with the calculations of the quantity that ought to be found.

At this moment (27th June) there is no reply to the second, because the chamber has not been reopened; but this may be said, that during

the first thirty-two days 720 lbs. were thawed, and that with substantially the same quantity of meat to keep. The next thirty days have not consumed 480 lbs., the weather being all the time of about the same average temperature. The reply to the third reason is most satisfactory. The towels laid over and around the meat were perfectly dry—not frozen—but actually dry; and we found the aqueous vapor of ventilation deposited like fine snow, and adhering to the under side of the lid cover of the chamber—a strong plate of iron. The chamber was left open more than four hours, and then closed, and the remainder of the ice replaced as before.

One of the reasons was that mentioned already—that I might repeat my former examination and check the results then obtained, as recorded in the first portion of this essay.

As soon as it was opened Mr. Harrison selected a large saddle of mutton (24 lbs.) that lay on the top of the stack, and a 19 lbs. piece of the thick ribs of beef (a roasting joint) from the very bottom of the chamber. Two exactly corresponding pieces (a saddle and ribs) were obtained from the butcher who supplied the pieces frozen. This meat had been killed about thirty hours, and of course was quite fresh. I caused them to be hung in my office, not as before in a corridor, because I thought the air inside would more nearly resemble that of a butcher's cellar or a gentleman's larder. I rigged saucers under the frozen pieces to catch any drip falling either during or after the thawing. Thermometers in the room registered 59·21 degrees.

I think it is due both to the reader and myself to state here why I have adopted the present method of placing my studies before the public, rather than that more usual in essays of the nature of this. Many years' experience has convinced me that in practical matters, and still more when those practical matters are of great importance, yet through ignorance give rise to prejudice, the best and safest plan is not to speak authoritatively and *ex cathedra*, but submit the details thereof in the homeliest language to the human understanding. On the present occasion I shall place as succinctly as I can all the facts arising out of the thorough examination of this second lot of frozen meat, premising that at every inspection Mr. Cosmo Newbery was present and assisted, and that Lieut.-Colonel Stephens did so on several occasions.

I intend, therefore, to record the results of our observations, as we made them, from day to day. Eleven o'clock a.m. was the hour of meeting agreed upon—though found to be not always a convenient one—for this purpose, as it completed each twenty-four hours from the time the meat was hung up.

At 11 a.m. on the 29th May, twenty-four hours after the meat had been exposed to the air, we found the temperature in the room 56·5 degrees. On examining the saucers we found hardly one-eighth of a fluid ounce of drip from the beef, and about half-ounce from the mutton, and this consisted mostly of blood. This seemed to have dripped down from the region of the kidneys, which, however, had been removed previous to the meat having been frozen. Both pieces smelled quite sweet. On taking the actual temperature of all the meat, we found that of the *un*frozen beef to be 54 degrees; ditto mutton 53 degrees. Frozen beef 50 degrees, at a depth of four inches in the thickest part; frozen mutton 52 degrees. The thaw was nearly complete.

We therefore deduce the ratio of thaw, in a temperature between 59·21 degrees and 56·5 degrees, to be for a thick lump of beef of 19 lbs., 1·26 hours per pound—that is, a little more than an hour of time to each pound of meat; and in the case of the saddle, a piece always presenting a large surface and no great thickness, just one hour to each pound weight. 24 lbs. took just twenty-four hours to thaw. I consider the determination, though in only a comparatively rough way, of a point of this nature of great importance to the dealer and consumer in the home country. And here I may add, that soon after the meat was taken out I cut off the beef some quite thin slices, and in the presence of a number of gentlemen showed them the length of time it took in the middle of the day to thoroughly thaw them. The ratio, according to weight of pieces, was nearly that of the mutton. Consequently, when the time of selling frozen meat in England arrives, there will be no danger about retailing small quantities; while the experiments already recorded show that the gravy does not drip out as the thaw goes on. This was plainly evidenced in the instance of these thin slices.

30th May.—At 12 noon to-day, twenty-five hours more, on entering I found several large blow-flies in the room, and noticed one on the frozen saddle of mutton; and fearing lest it should have blown the meat, I removed a few small bits from the place, and then had all the pieces enclosed in muslin bags, to keep off flies for the future. Temperature of the room nearly 60 degrees. Yesterday, and still more to-day, the weather was close, warm, and damp. Wind N.E. to E. All the pieces were perfectly good; but the frozen beef was *firmer* to the touch than the unfrozen, and no sign of mildew or sourness. Much grey mildew on the unfrozen piece, both on the thick and thin parts exposed.

There was nothing to remark about the mutton to-day, except that there was a single drop of reddish fluid hanging on the end of the spine

bone of the frozen piece ; and after removing the bits where the fly had been seen, both the frozen and unfrozen pieces were dusted with flour. Both pieces were perfectly sweet, and in the opinion of an experienced housekeeper, every way likely for keeping yet two or three days more, even in this very unfavorable weather. There was no mildew on either joint of mutton. As the weather became worse, I deemed it right to watch the meat very carefully. So at 4 p.m. I found the temperature of the room 60 degrees. Rain was falling, and I closed the windows completely. Again at 7.20 I examined the thermometers, and found the temperature rising—60·5 degrees. This was fifty-six and a half hours after the meat was taken out of the freezing-chamber. Nothing fresh to remark.

31st May.—At 11 a.m., thermometer in the office 59 degrees. We found all the meat quite sweet ; it was now seventy-three hours out of the chamber. I caused the frozen saddle to be cut down the spine, and sent one-half to be roasted for luncheon at 1.15 p.m. At the same time I had a large steak cut from each of the pieces of beef, to be served up at the same hour.

I invited several gentlemen, not directly concerned in pastoral pursuits, of known repute, and competent judges, to partake of these meats, who met at the appointed hour. I append the note made on the occasion, merely remarking that it was only by guessing that any one could say which pieces had been frozen and which had not.

The portions not used were ordered to be examined again next day, to see if the cold meat would prove as good in proportion as when fresh roasted.

June 1st.—1.20 p.m., thermometer in office registered 62 degrees, with wind north-westerly, very light, weather cloudy and muggy. Mr. Newbery and I examined the meat, in company with Lieut.-Colonel Stephens and Mr. and Mrs. Shaw.

After being ninety-nine hours out of the ice chamber, the frozen beef was found to be quite sound and sweet ; but in one or two places where thermometers had been thrust into the thin part near the bone, it showed signs of approaching change. I dissected the meat from the bone, but found no evidence of change but that just noted. Yet, for safety sake, it was put into a hot oven for ten minutes, and ordered to be cooked, along with the unfrozen piece for luncheon next day. This meat was sour where the steak had been cut off, and much covered with grey mildew. The half of the saddle was looking wonderfully good, and devoid of any smell but that of mutton, even under the kidney fat and the flaps. It was ordered to remain until to-morrow.

It is but fair to remark that the beef was much handled and breathed upon by visitors anxious to satisfy their curiosity to the utmost. We observed another matter of some interest to ourselves :—viz., when the frozen beef was first hung up the whole of the fat visible was quite *white;* it remained so until after the thawing was complete, and only after forty-eight hours did it resume fully its original yellow-brown color. It was then wholly undistinguishable from the unfrozen as far as the color of the fat was concerned.

To-day we tasted the cold mutton from yesterday and found it excellent. Some of it was made into a hash, and much relished by the gentlemen who had been invited. Mr. Harrison himself was present on this as on most of the previous occasions at luncheon.

2nd June.—We inspected the half saddle of mutton at 11.30 a.m., and found it perfectly sweet, even where the thermometers had been inserted. This was one hundred and twenty-three hours after being removed from the freezing chamber. The unfrozen mutton was also quite sweet. This morning our thermometers registered 58·34 degrees. It seemed hardly worth while to watch the keeping longer, since one hundred hours would be ample to allow it for sale and distribution in England, and place it, under equal conditions of temperature, &c., on a level, at least, with any fresh butcher-meat.

JOHN I. BLEASDALE, D.D.

The above corresponds with the notes taken on the occasion from day to day.

J. COSMO NEWBERY.

I have had daily access to the papers connected with this experiment, have personally inspected the meat on several occasions, and have much pleasure in certifying to the correctness of the above statement.

W. F. STEPHENS, Lt.-Colonel, H. M. Indian Army.

MEMORANDUM.

Public Library, Museums, &c.,
Melbourne, 2nd June 1873.

We, the undersigned, having partaken of a saddle of mutton, and ribs of beef, preserved by Mr. Harrison's freezing process, desire to state that we have found the meat in admirable condition, not only palatable *but absolutely indistinguishable from fresh meat.*

We are of opinion that if meat can be landed in England in the same condition as that eaten by us, the English purchaser can partake of a joint of mutton or beef

absolutely as good in every way as the best of freshly-killed meat procurable from his own butcher.

(Signed)

HENRY AMSINCK,
WILLIAM GILLBEE, Surgeon-Major V.V.,
GEO. HARRISON, Capt. R.N., Melbourne Club,
J. COSMO NEWBERY, Superintendent Technological Museum,
MARCUS CLARKE, Secretary to the Trustees of the Public Library, Museums, &c., Melbourne,
W. F. STEPHENS, Lieut.-Colonel, H. M. Indian Army.
JOHN I. BLEASDALE, D.D., F.G.S., Honorary Member of the Medical Society of Victoria, &c., &c.

NOTE.—A question has been asked as to how the difference can be accounted for between the temperature of the meat recorded at page 54, as found after the first lump of beef had hung in a temperature of 67° for 24 hours—viz., 32°—and that recorded at page 61—viz., 50°. I consider it owing to the shape of the piece (nearly a square one in the first instance), and a not unusually thick one (*ribs*) in the second. Whatever the explanation may be, I recorded what the thermometers indicated.—J. I. B.

Public Library, Museums, &c., 10th July 1873.

"HARRISON'S MEAT-FREEZING EXPERIMENTS."

SIR,

It was my intention to have prepared certain tables of observations on the second experiment taken from day to day, by way of a finish to my paper ; and though I have the data by me, Mr. Harrison suggests, and Mr. Newbery and I agree, that it would be no easy matter to make them intelligible to the general reader.

I will therefore content myself with saying that 15 cwt. of ice have sufficed to maintain and protect, at a temperature below 32° Fahrenheit, 27 cubic feet of a freezing chamber for 74 days, and that the whole of the ice is not yet thawed.

Mr. Newbery and I visited the ship *Norfolk* to-day, and were shown by Mr. Harrison the preparations already made, and others in progress, for shipping to London 20 or 25 tons of beef and mutton; and so far everything appeared as promising of success as could be desired.

We learned that already a saving in the cost of non-conducting substances for packing, and consequently of space in the vessel had been effected, by the substitution of ground tanning bark, properly secured, instead of sawdust. Apart from any other consideration, it is even a better non-conductor than sawdust, and far superior to tallow in that respect.

Of course it must be idle to speculate upon the results to this colony until we hear of the successful arrival of the meat in England, and the reception this first lot meets with. If it prove successful and receive a worthy welcome, the effect will be in the first instance certainly to greatly change our present notions of agriculture near the shipping ports, and convert many a thousand acres of sheep pasture into meadows and fattening closes. We can rear young stock and grow skeletons anywhere, or import them from the neighbouring colonies, but to turn out the fine marbled beef that the Englishman justly esteems, the cattle must be fed in places where they need not be driven any considerable distance to the slaughter-house ; and fortunately such lands abound near each of our seaports.

I have, &c.,

JOHN I. BLEASDALE, D.D.

A. R. Wallis, Esq.,
Secretary of the Department of Agriculture.

Melbourne, 1st August 1873.

Dear Sir,

I think I need say no more about Mr. Harrison's process than I have done in the enclosed letter to the *Age*, and its accompanying certificate from the gentlemen who met at my office to partake of the salted pieces.

Should Mr. Harrison's experiment succeed commercially and popularly in England, no man can at present calculate the magnitude of its effects on cattle and agriculture in Australia.

And with best wishes that we may live to witness this contribution to the equalization of the food markets of the world,

Believe me, yours faithfully,

JOHN I. BLEASDALE, D.D.

A. R. Wallis, Esq.,
Secretary of the Department of Agriculture.

HARRISON'S FROZEN MEAT.

To the Editor of the "Age."

Sir,

Men who know nothing personally about the pleasure experienced by the student of a difficult problem when it has been for the first time successfully solved may sneer at me for placing on record the detail of the last operation on Harrison's process of freezing meat for exportation, and my own gratification at the result, confirmatory (in the chemical meaning of that word) of all and each of the experiments already recorded. For while there had been obtained abundance of evidence upon the safeness of the process as a preservative one, and also that on arrival in Great Britain or India there would be more than sufficient time for its distribution or transmission by railway to outlying towns or stations, there yet remained one point unsettled, and by no means the least important, viz., would the flesh when thawed take salt? It is obvious that if it could be salted the wholesale purchaser would be secured against ultimate waste, as there is always a market for salt meat. In the study of other circumstances this one was overlooked till the very last, and it was only after Mr. Harrison had sailed for England with his large experiment that it occurred to me to think of salting. I succeeded in obtaining all I required for this purpose from the person to whom Mr. Harrison had intrusted the removal and disposal of the meat remaining at the Exhibition buildings. It should in all fairness be stated that during the fortnight preceding the sailing of the ship *Norfolk* Mr. Harrison had wholly neglected the preserving chamber, so that the meat was hardly protected at all, yet it was found to be sound after having been opened twice during the ninety-two days that had elapsed since it was first frozen. I took for the purpose of this investigation a large rib of beef and a leg of mutton that had been cut into in several places some days before, and caused them to be put in salt *without* saltpetre. It was left in salt seven clear days, and took it most perfectly, the beef even more severely than the mutton. On the 31st July, the undermentioned gentlemen partook of it, and have left the subjoined expression of their opinions as to the success of this last stage of the study and investigation.

JOHN I. BLEASDALE, D.D.

The Public Library, 31st July 1873.

We, the undersigned, having this day partaken of a portion of a leg of mutton, and ribs of beef, salted, preserved by Mr. Harrison's freezing process, wish to state that we found the meat palatable, wholesome, and in no way inferior to that of an animal killed and salted by a butcher in the ordinary course of his trade. The meat of which we partook has been preserved, frozen, and then thawed eighty-five days, and had then been subsequently seven full days in salt *without* saltpetre—in all ninety-two days. If, therefore, Mr. Harrison can, with profit to himself, supply meat to the tables of English buyers in the same condition as that which we have now tasted, there can be, in our opinion, no doubt whatever of the commercial success of his invention.

(Signed)

Robert Simson,
Charles Ryan,
A. R. Wallis,
Marcus Clarke,
John J. Shillinglaw,
J. Cosmo Newbery,
Jno. B. Hughes,
W. F. Stephens, Lt.-Col.,
John I. Bleasdale, D.D.

APPENDIX C.

NOTES ON OBSERVATIONS MADE DURING THE LATE LOCUST PLAGUE.

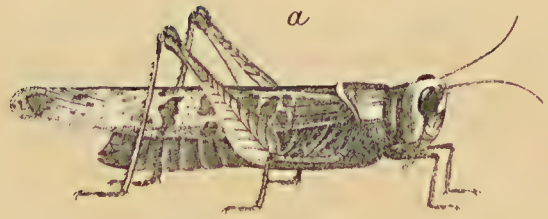
BY MR. THOMAS BATH.

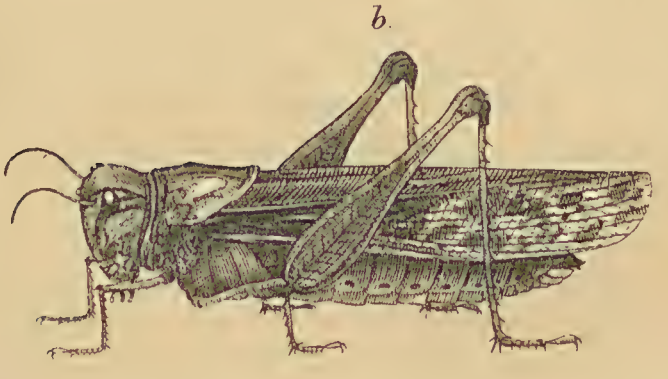
With a Prefatory Note by the Secretary for Agriculture.

PREFATORY NOTE.

The locust visitation of the past season created much alarm in those districts in which its ravages were most felt. The damage, done by these insects, is probably far in excess of what has been attributed to them, and this in part may be ascribed to the insignificance in point of size of a single individual. The injury effected by the several species of locust—or more properly by swarms of these insects—is not confined to the grass and other herbage which they consume. It is by polluting large quantities of food with their excreta so that sheep refuse to feed after them, and by biting off the grass close to the surface and thus laying waste whole tracts of country, that they effect the greatest harm. Kirby and Spence, in their *Introduction to Entomology*, treating of this insect, remark:—"To look at a locust in a cabinet of insects you would not at first sight deem it capable of being the source of so much evil to mankind as stands on record against it." . . . . . "Yet,

PLATE II.





a. *Œdipoda musica (Fabraius)*

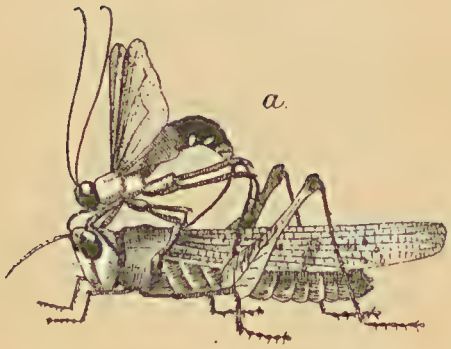
a'. *Same viewed from above*

b. *Decticus verrucivorus*

b'. *Same viewed from above*

c. *Supposed larvæ of Ichneumon as extracted from body of locust*

PLATE III.



a. *Œdipoda musica with Ichneumon on back*

b. *Bracon capitata (male)*

b¹. *" " (female)*

c. *Section of earth shewing locust eggs as deposited*

PLATE III.A

Drawn & lith^d by S.B Bonney Crown Lands Office Melbourne

a *Edipoda musica.*

b *Decticus verrucivorus.*

although the animal is not very tremendous for its size, nor very terrific in its appearance, it is the very same whose ravages have been the theme of naturalists and historians in all ages, and upon a close examination you will find it to be peculiarly fitted and furnished for the execution of its office. It is armed with two pairs of very strong jaws, the upper terminated in short and the lower in long teeth, by which it can both lacerate and grind its food; its stomach is of extraordinary capacity and powers; its hind legs enable it to leap to a considerable distance, and its ample vans are calculated to catch the wind as sails, and so to carry it sometimes over the sea; and though a single individual can effect but little evil, yet when the entire surface of a country is covered with them, and every one makes bare the spot on which it stands, the mischief produced may be as infinite as their number." Most interesting accounts of the damage done by the migratory and other locusts in Asia, Africa, and various parts of the European continent will be found in the same work. In India swarms, whose density is such that it totally intercepts the solar light, are not unfrequently seen.

The locust belongs to the order of insects called Orthoptera. The species most common in Victoria (figure A., plate II.), I am informed by Professor McCoy, no doubt is the Œdipoda musica of Fabricius, or Gryllus flavus of Linnæus, a very common locust in Australia and many other countries. This insect is not, according to the Professor, as supposed, the true "migratory locust," but a much smaller species. Probably it is closely allied to the Gryllus (Locusta) erythropus of Gmelin, or the Acrydium femorale of Olivier, the red legged locust of America (mentioned by Harris in his *Insects Injurious to Vegetation*), which from time to time has created so great ravages in that country. Figure A 1. shows this insect viewed from above, and figure A., plate III., the same with an Ichneumon on its back, in the point of depositing her eggs under the thorax of her victim. Figure B., plate II., represents the large green species, which has caused so much desolation during the past season in the vineyards of the upper Yarra. Professor McCoy, to whom the drawing of this insect, furnished by Mr. Bath, was submitted, has reported that he could not distinguish it by the drawing from the European "wartbiter," or as it is called the "Decticus verrucivorus." Figure B 1. shows the same insect viewed from above. Figures B. and B 1., plate III., represent the male and female of an Ichneumon fly, closely allied to the Bracon capitata. Figure C., plate II., represents the supposed larvæ of the Ichneumon fly, as extracted from the body of a locust. Professor McCoy however informs me that these do not represent the larvæ of the Ichneumon, but of a tachineous two-winged fly, parasitic on the

adult locust. Figure C., plate III., represents a section of earth, showing the eggs of the locust as deposited in the ground, from which an idea may be formed as to the number of eggs buried in the earth in those districts, in which the locusts were most numerous.

Though locusts have been known for centuries, and during that time have continued, periodically in almost all countries, to do perhaps incalculable damage to mankind, yet no satisfactory means of checking and destroying them has yet been discovered, notwithstanding various remedies have been tried. Professor McCoy writes that, "in the south of Europe, where the population is comparatively dense and the labor of children cheap and abundant, municipalities pay a regular sum for so much weight of the eggs gathered out of the ground; and this is undoubtedly, under such circumstances, the best way of stopping the ravages of the insect, not only in its adult winged state, but in the much more lengthened life of the equally voracious earlier wingless stages of growth." "But," he adds, "I suppose this is quite impracticable in so large a country as Australia." Locusts are also taken by means of a piece of cloth held at an angle of 45° with the ground, the lower edge touching the surface. The cloth is then drawn along by two persons, one holding it at each end, in the opposite direction to that in which the locusts are flying; the insects get entrapped and may be captured and killed by dipping in warm water. But this means of checking them is perhaps also impracticable in this country. There is an insect, however, a species of Ichnuemon fly (figure B., plate II.) which, it would appear—though it is disputed—is destined to prey upon and destroy the locust. Mr. Howitz, to whom I am indebted for the drawings of this and the other insects, informs me that he has, in Europe, witnessed the female Ichneumon alight on the locust, and then, bending her body and bringing her ovipositor beneath her, insert it under the thorax of her victim. Mr. Howitz's statement is confirmed by Mr. Davey, a gentleman residing at Stawell, to whom I submitted a photograph copy of the drawing, showing a locust with an Ichneumon on its back, requesting him to inform me whether the relative position of the two insects was similar to what he had stated that he had witnessed. He replied as follows:—"I note the photograph with much pleasure, and indeed the gentleman who drew the insects, must be a close observer. The attitude and position of both are perfect. I have often watched the flies in England at their work on various caterpillars, notably the green caterpillar of the common cabbage butterfly. Now these caterpillars are not nearly so active as the locust; hence the fly in England performs her work slowly as compared with the fly here. Moreover, the locust is on the ground at the time, and

not raised as are the caterpillars, and being generally among thick grass or corn it is very difficult to watch the fly at her work. Still I have seen the fly dozens of times dart on to the ground, and although I cannot say (through the intervening herbage) that I have actually, except once, seen an Ichneumon upon a locust, I have seen enough to convince me that these flies were laying their eggs in the locusts, as there was no caterpillar of any kind, or indeed any other insect to be seen where they were darting down, except the locust, and once I witnessed a fly rise from a locust; I was then sure, *and for the first time spoke of it.* We had three distinct swarms of locusts last year, but it was not until the last one made its appearance in March, that I observed the flies. I noticed that when the locusts were most numerous, the Ichneumon fly was to be seen in greatest force. The locusts for the last three years have been travelling in one direction, nearly due south, and I believe that in course of time they will disappear in the sea. I understand that swarms of locusts were seen on the Wimmera in 1848, Mr. C. Wilson of Walmer having so informed me. But after that year they did not trouble us here till 1862, when they appeared again, and on the North Brighton run especially did much mischief. They then seemed to me to be travelling north-east towards the Richardson, and when next they appeared, in 1869, they came from the Richardson in this direction. I have noticed that one patch of ground, in which the locusts had laid their eggs, was flooded for days together, at three different times during the winter, but that, nevertheless, the vitality of the eggs was not destroyed."

Mr. Davey states that locusts have been seen on the Wimmera during three successive seasons, in the first year only one, in the second year two, and in the third year three distinct swarms having been observed. He also mentions that each swarm travelled in the same direction, viz., from north towards south, and that it was not until last season that they reached as far south as Ararat.

Count Castelnau, who has made entomology a study, in a letter to Rev. J. I. Bleasdale, D.D., speaking of the Ichneumon, remarks :— "This parasite is most important, as I believe it will be to it alone that we may one day owe the disappearance of the locust, which has done these years, in the north-west of Victoria, damages far exceeding all that has been said. They have, in the Wimmera, fully destroyed one-fourth of the food of the sheep, and reduced in that proportion the pastoral production of the runs." Again, Harris, in his *Insects Injurious to Vegetation*, mentions that "a kind of sand-wasp (probably meaning an Ichneumon), preys upon grasshoppers, and provisions her nest in

them." Professor McCoy, however, to whom the insects were submitted for examination, holds a different opinion. He writes:—"The notion that the Ichneumon fly would destroy the locusts, as it checks the depredations and increase of moths and their larvæ, is quite erroneous, for in the perfect winged state in which they are attacked their life is already near an end, and they are occupied in laying their eggs for next year's brood, while the Ichneumon checks the spread of the other pests by causing the death of the larvæ *before* it can attain its adult condition, and lay its eggs." But others, again, have informed me that the Ichneumon, in attacking the locust and laying her eggs within it, destroys not only the adult insect but, likewise her eggs. And they thus explain the circumstance. They maintain that the larva of the Ichneumon, being parasitic on the locust, matures within the body of its host, feeding upon its juices, and thereby by degrees destroying the adult insect, and that it, in doing so, prevents the locust from duly maturing *her* eggs. It will be seen then that a difference of opinion exists as to the influence, exerted by this insect in the suppression of the locust.

Domestic poultry (more particularly turkeys) and even pigs, consume the locust in great number; and many of our native birds—notably the magpie and the laughing jackass—devour large quantities. Mr. Davey informs me that during 1870–1 and 1871–2, the locusts on the Wimmera were followed by a flock of birds, resembling in form and flight the swallow, but being of nearly twice the size. This bird, he describes as being of a slate colour on the back, and a light dull brick red on the breast. These birds, he says, were very active in destroying the locusts. Professor McCoy informs me that this bird is scientifically known by the name Artamus superciliosus. The Indian minah, also, which has been introduced by the Acclimatisation Society, is a great enemy of the locust. The absolute necessity for strictly preserving all insect-eating birds in this country, where the plagues of the locust and caterpillar are of so frequent occurrence, and where insect blights are yearly becoming more and more prevalent, is a matter, which demands earnest consideration, and one, which should receive attention at the hands of the Legislature.

A. R. W.

NOTES ON OBSERVATIONS MADE DURING THE LATE LOCUST PLAGUE.

On 17th January 1873, the locusts made their appearance at Learmonth in comparatively small numbers, but in a few days they came like a snow-storm, advancing generally in a southerly direction. They fly at about

the rate of six to eight miles an hour ; and, being fond of young grass or clover, they eat it off quite bare.

The locusts seem to eat the youngest and sweetest of the grass first, as sheep would do, but after that is gone they will take the stronger more rank herbage. They did not appear in sufficient numbers to darken the sky, as they are reported to have done in other places. When most numerous, they were at the rate of about one to the square inch. A dog running over the ground appeared as though running through a swarm of bees, so thickly would the locusts get up round him ; and when at a distance he would appear as though in a thick fog. When they had eaten all the grass and other herbage they steered southward, but always left behind them numbers sufficient to eat off the grass, &c., as it grew. I found they were very fond of the herbage which grew upon the irrigated portions of my farm.

Locusts are very ravenous feeders, and will eat when in captivity.

Stock do not like to feed after them, as they pick out all the tender feed and leave the dry grass or stems too dirty for them. Domestic poultry are fond of the locusts, and devour them in great numbers. Turkeys, more particularly, are valuable locust catchers. They commence their work early in the morning, when their prey is easily caught, and at night return with their crops well filled. But all our poultry could do but little to keep down the pest.

The locusts fly very high on hot days. In March last, when in a boat on Lake Learmonth, I observed a number of locusts flying across the lake at a great height, say 100 yards. They could be seen best by looking in the sky, nearly in the direction of the sun. They seemed to have no fear of being drowned, although the lake is more than a mile across.

I saw an account of the locusts being on the Wimmera one or two years ago, in which it was stated that they were working their way south at about the rate of twenty-five miles per annum. Therefore I did not expect them for two or three years yet. I think the reason they advanced so rapidly this year is that the rain we have had during the past summer provided ample green feed for them, and they were thereby enabled to proceed to the very southern boundary of the colony in a few weeks.

I wish that we had an entomologist in the colony who could give us a description of our insects, as a record of the locust plague should be kept and compared with those of other places.

The locusts here are not nearly so large as I expected to see them, and I do not wonder at some people persisting in calling them grasshoppers.

I will give a description of our unwelcome visitor as correctly as I can, and I think, by the aid of the accompanying drawings, furnished by Miss M. Gatliff, of Ballarat, one may be able to form a pretty true idea of what our locust of 1873 is like.

The locusts differ in color and shape. Some are much thicker and shorter than others, and some again much darker than others ; and, strange to say, it is difficult, if possible, to find two exactly alike. Our common locusts are brown with black spots on the wing-covers and thighs, legs reddish, head and body nearly black. The wings are shorter than the wing-covers. They are fanlike in shape, delicate in texture, whitish and semi-transparent, and have a black spot at the outer corner. The locusts that I weighed averaged sixty to the ounce.

The following is about the measurement in inches of a full grown locust :—Total length, forehead to wing-cover tip, 1·6 ; wing-cover, 1·2 ; fanlike wing, 1 ; leg and thigh, 1·2 ; foot, 0·2 ; horn or antenne, 0·35 ; forehead to extremity of body, 1·2 ; the wings extend behind the body, 0·4 ; and the wing-covers, from point to point, about two and a half inches, 2·5.

There are numbers of young locusts here about half an inch long, and without wings, others with wings just coming, and some just able to fly. They must therefore have been bred in the district. In February the locusts commenced to bore holes in the ground and lay their eggs. They lay, I have found, from thirty-two to forty-five eggs each. In the choice spots where they deposit their eggs may be seen about two hundred holes to the square foot, containing about eight thousand eggs ; and many acres are covered thus. The eggs are now much larger than they were when first laid, two months ago, and they seem to increase in size. I wonder, will they turn out young locusts next spring ? If they do, I pity the farmers about here. The locust bores the hole with its posterior extremity, which is furnished with a hornlike substance, divided in four segments. It has the power of pushing this into the ground and prising off the dirt to make room for the whole abdomen, which is forced into the ground up to the wings, to a depth of about an inch or inch and a quarter under the surface. The hole is then nearly filled up with eggs. The locust is unable to extricate itself suddenly from the hole, for if pulled out by the hand often part of the body will remain in the ground. I think the old locust dies shortly after laying her eggs, as numbers of dead ones may be found near the holes. When the locusts are full of eggs they have a plump appearance, and if pulled asunder will be found to contain a lot of eggs, about the number beforementioned. Sometimes a live maggot may be found in them, and often two or three, and in one

case I found six live maggots in the same locust, but they were of different sizes, and, if laid by the Ichneumon fly, must have been pecreed at different times; but what these maggots come to I am unable to say—whether a common fly or an Ichneumon. I hope some one more versed in entomology than I am will answer.

Some time ago, Mr. T. Davey, of Longernong, wrote of the ichneumon fly as being the enemy of the locust, and mentioned that the Ichneumon was numerous on the Wimmera. I think, however, they are not very plentiful about here; but if they destroy the locust as alleged, I hope they will become as numerous as the locusts are here.

Mr. Davey sent me a description of the Ichneumon fly; and, from that description, I think I captured the right ones, both male and female, a sketch of which I enclose herewith, drawn by Miss M. Gatliff, as before stated.

There is also a beautiful green locust here, larger than the brown one, but not very plentiful. I think they are not of the same family. Their fanlike wings are yellow, black, and white. Sketch as enclosed.

THOMAS BATH.

Ceres, Learmonth, 25th April 1873.

APPENDIX D.

PLANTS ADAPTED FOR LIVE FENCES.

BY THE INSPECTOR OF STATE FORESTS.

In early days of settlement, when timber was abundant and labor cheap, settlers never dreamed of the change that has occurred within so brief a period; every one thought the forests would last for ever, and that, when the time came that their fencing would require renewing, they would have only to fell the timber growing so abundantly in their immediate locality, and replace their fences as required.

At that time box and redgum were plentiful on almost every creek, and, as long as they lasted, constituted the principal timber used in fencing. As settlement increased, subdivision of areas into farms took place, and the demand for fencing timber became proportionately greater.

The pastoral tenant also fenced in his pre-emptive section, and generally the best species of timber was employed; accordingly the finest timber began to diminish at a rapid rate until settlers found out that fencing was one of the heaviest items in their expenditure.

Railways alone have absorbed an enormous quantity, and the demand annually increases, and the want of ordinary timber for this purpose adds enormously to the cost of every new line.

Agricultural settlement, as it at present progresses, requires an inexhaustible supply. The fences of early settlers are fast crumbling to decay, and require renewing ; yet, with all this large amount of property going rapidly to decay, few have ever given it a thought, that had live fences been established before the post and rails had become decayed, an enormous saving would have been effected both to the country and to private individuals.

In many localities where fencing timber was abundant in early times, not a tree fit for this purpose is left, and when new fencing is required it has to be brought frequently a distance of ten or twenty miles.

A few of the early colonists brought seeds of hedge plants, which they planted around their homesteads ; and I can remember nearly twenty years ago seeing some tolerable good hedges in a thriving condition, but either from a want of knowledge how to manage them, or from carelessness, they were allowed to grow as a wilderness, scattering their seeds far and wide over the pasture lands and cultivated fields, until, in many instances, they became a complete nuisance and pest.

Some ten years ago good examples of thorn hedges were to be seen on the banks of the Yarra and Plenty rivers, showing unmistakably how well the climate is adapted for this plant.

I know of no part of Victoria but where some species of useful hedge plants will succeed, if given a fair trial, and proper attention be paid to its cultivation ; and I know of few improvements that would enrich the general appearance of this country, or increase the value of landed property, more than hedges, provided they are properly managed.

The Osage orange (Macluria aurantiaca) has been highly recommended, and in America it is not equalled, but I must confess that, unless in deep alluvial soils and in warm districts, I have never yet met with a substantial fence of it.

I believe, however, that in the deep warm soils of the Goulburn and Murray districts, hedges of Macluria may be grown to the greatest perfection ; a hedge of it, when properly managed, is invincible.

Another plant frequently employed for hedges in South Australia is the acacia armata. This plant, although indigenous to Victoria, seldom makes what should constitute a substantial and permanent fence ; it thrives and looks well when young, and I have seen some excellent garden fences of it, highly ornamental for a time, but in the course of about seven years it dies out in large gaps, and becomes most unsightly

and useless. Like all plants of this species, its roots poison the soil in the proximity, and when removed it is years before anything else grows satisfactorily on the same ground.

Furze (ulex Europæus) has been frequently tried in many parts of the colony, but, like the acacia, becomes worthless after three or four years, and unless well kept during that period, and prevented from seeding, sheds its seeds in myriads, and, spreading over the adjoining land, takes complete possession of the soil, and is troublesome to eradicate. Further, owing to the accumulation of dead matter in the bottom, it is very apt to fire.

The common privet (ligustrum vulgare), when well kept, forms a very ornamental hedge, but where resistance is required it is too feeble ; mixed with the whitethorn, in small proportions, it forms a splendid hedge, being evergreen nearly all the season.

The Chinese privet (ligustrum sinensis) forms a splendid hedge, being stiff and strong ; when well managed it forms one of our best hedge plants for ordinary purposes. One great advantage of the privet is, that it grows freely from cuttings, and takes only a few years to make a hedge.

The common olive (olea Europæa) forms a magnificent hedge, and should be planted extensively for shelter in exposed situations ; I have seen it growing luxuriously on the banks of the Murray, and equally well on the shores of Hobson's Bay.

The several species of pittosporums form most ornamental hedges, and where shelter is required quickly we know of no hedge plant that sooner affords it ; but the most of the species are too slender in their habit to become an outside boundary fence. Pittosporum undulatum, however, grows robust, and, when well kept while young, makes a most formidable fence, and is always of a pleasing evergreen colour.

Gleditschia triacanthos has been tried in some localities, and forms an impenetrable fence when well looked after ; its stout spines makes it a formidable barrier against cattle or other animals, but, like the family to which it belongs (the acacia), its roots spread and destroy everything near it ; however, it is one of the hedge plants that ought to be encouraged in agricultural districts.

Another plant of the same natural order, and of the same habit as the gleditschia, acacia horrida (or African thorn), makes a substantial fence if well kept, but unless great care is bestowed upon it when young, so as to keep it well filled up at the bottom, it is apt to become naked and bare. The spines of this species are even more formidable than gleditschia triacanthos.

The hawthorn (cratægus oxyacantha) has proved to be the best of all

hedge plants for an efficient fence in any soil of ordinary quality ; some good examples of it may be seen in the agricultural districts around Kyneton, Geelong, and Ballarat, and if properly kept nothing can surpass it for longevity and efficiency.

It is well known to all who have had experience in the management of hedges, that the first and most important point is, to have the ground thoroughly prepared before planting. It should be trenched or subsoil-ploughed to a depth of at least eighteen or twenty inches, varying according to the depth and quality of subsoil. Where permanency is expected, a strip four feet wide at least should be so prepared and thoroughly drained.

Plants of not less than two years old should be procured, and planted in single lines six inches apart. It is a mistake to plant in double rows ; they never can be kept clean except by incurring great expense ; moreover, they require a much greater time to form a fence. After planting, nothing further than cleaning and loosening the soil around the plants is required for the first two years. After a thorn hedge has been two years planted, it should be thoroughly manured on both sides, either with well decomposed stable manure or with a mixture of crushed bones and superphosphate. This dressing should be immediately dug in around the roots ; the steel fork is the most suitable implement for this purpose, being less liable than a spade to injure the young root-fibres. The influence of manure is not more apparent on any plant than the whitethorn, and no hedge plant sooner repays the labor expended.

Pruning should begin about two years after planting, or, if the young plants are growing vigorously, after the first year's growth.

The most important things to be attended to in the raising of live fences are, well prepared ground, a judicious selection of the plants employed, thorough cleaning, and thorough protection from the nibbling of animals.

These things attended to, live fences would soon enliven the monotony of post and rails, and largely increase the value of landed property.

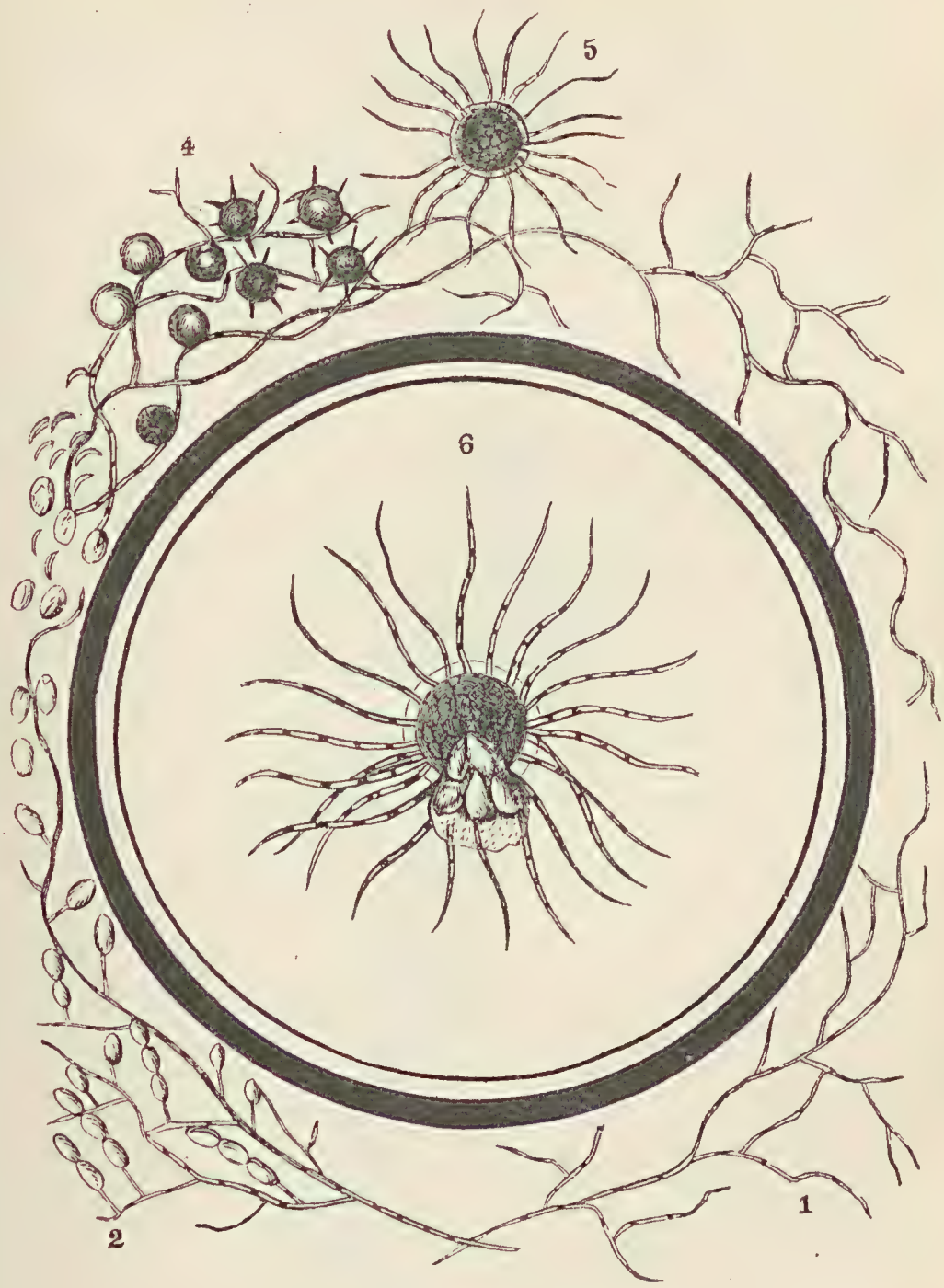
APPENDIX E.

THE VINE DISEASE, "OÏDIUM TUCKERI."

BY THE SECRETARY FOR AGRICULTURE.

It is distressing that the past two seasons should have added another to the many woes of our vignerons. The Oïdium Tuckeri first appeared in the gardens around Melbourne towards the close of the season

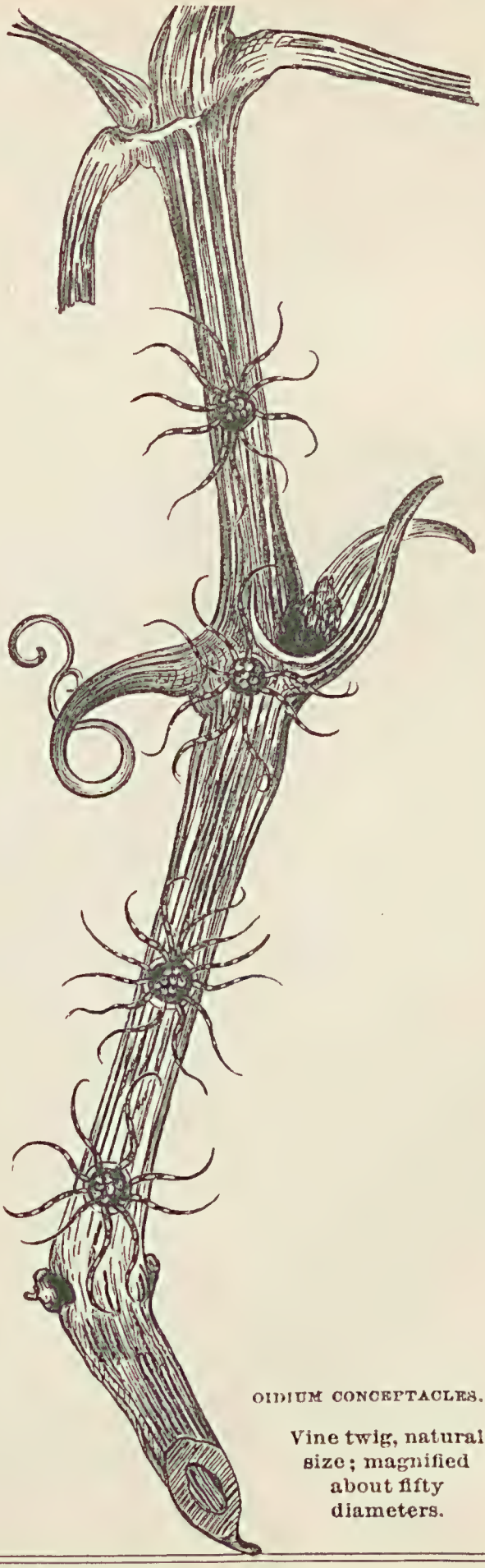
PLATE IV.



OIDIUM TUCKERI.

An erysiphe fungus of the European grape vine. Figs. 1, 2, 3, 4, 5, and 6 represent its various stages of growth. The small conceptacles (4) are first yellow, then change to brown. Fig. 6 is represented in the act of bursting and throwing out its sporangia.

PLATE V.



OIDIUM CONCEPTACLES.

Vine twig, natural size; magnified about fifty diameters.

Photo-lith^d by J Noone Crown Lands Office, Melbourne.

1870–1; and since that time it has gradually increased in magnitude. However, its ravages during the past season were, perhaps, not so generally destructive or wide-spread as our experience of the disease in the season 1871–2 led us to anticipate. Notwithstanding, the damage done is considerable, and sufficient to cause concern relative to the future of the vine industry in this colony. In Madeira, not many years since, the prevalence of this disease necessitated the rooting up and replanting of the vineyards throughout the entire island, and its spread in our vineyards threatens us with a like evil. In fact, in some parts of the colony, refuge has already been sought in this stamping-out process.

The visitation and rapid spread of oïdium have been generally attributed to the peculiar nature of the two last seasons. These, as is well known, have been unusually cool and moist, more particularly that of 1872–3. The inference drawn is, that a humid, close condition of the atmosphere is the most favorable for the growth of this fungus. The experience of other countries, however, tends to assign other causes and atmospheric conditions as the most congenial to the growth and production of oïdium.

In a comprehensive report on fungoid diseases in plants, published in the tenth volume of the Transactions of the American Department of Agriculture, from which the plates published herewith are taken, Mr. Thomas Taylor, Microscopist to the Department, treating of oïdium, remarks:—"Some forms of mildew are produced by excessive moisture, assisted by a certain degree of heat, while certain other forms are matured only under comparative dryness and heat. '*Oïdium Tuckeri*' seems to be one of the latter class, judging from the experiment made, in one of the hot-houses of the department, and believed to be the first test experiment of its kind. An experimental glass-house, in which grew a variety of grape vines, native and foreign, was selected for the test. Mr. Saunders, the superintendent, gave orders, on the 24th June of the present year (1871), that the usual watering of the house be dispensed with for a time, at the same time stating that, as a consequence of this withholding of water, *Oïdium Tuckeri* would quickly appear. In twelve days afterwards this fungus made its appearance on the foreign grapes, covering them in a few days with a heavy coating of mildew of a very destructive character. The leaves and stems were also covered with the mycelium, spores and fruit of the fungus in all its stages."

"It is not supposed that extreme atmospheric dryness alone produces this mildew. The organic germs may be connected with the vine internally or externally, but heat and a certain degree of dryness

would seem to foster its growth in a material degree, and the experiment proves that extreme dryness facilitates the growth of this fungus." These remarks would appear to be borne out by observation in this country. I am informed by Mr. James Banks, a careful observer, who has paid great attention to the appearance and spread of the oïdium in his own vineyard, that his experience of the disease tends to corroborate Mr. Taylor's report. Mr. Banks' vineyard is situated on a slope, running back from the Moonee Ponds creek, and has an eastern aspect. The lower portion of the vineyard abuts on to a piece of marshy ground, whereas the upper portions lie high and dry, and are in addition thoroughly drained. However, it was not in the lower portion that the disease made its first appearance. The first attack was made on vines about half way up the hill, growing in a piece of well-drained ground; and, strange as it may appear, the vines first seized were exposed by a gap in the hedge to the hot north wind. Mr. Banks has found that the oïdium, in his vineyard at any rate, made the most rapid progress when hot winds prevailed, after a period of calm still weather. I am likewise informed, by those who have had much experience of indoor vine culture in England, that the oïdium developed itself in the vineries just at the time when the grapes were ripening, and it was necessary to maintain an increased heat and atmospheric dryness in the houses; but that by strewing sulphur on the flues, and thus fumigating the building, the fungus was readily broken down and destroyed.

The above remarks have been made with a view to bring under the notice of vignerons the diversity of opinions entertained relative to the origin and development of this disease, and to provoke observation thereon.

Oïdium Tuckeri attacks some varieties of grape vine much more readily than others. The more delicate table varieties suffer most, whereas the rough-leaved Burgundy and native American varieties will not, it is stated, take the disease. This malady was first observed in English hothouses in 1845. In about the year 1847 it made its first appearance in French vineries, then spread rapidly among the plants cultivated in the open air, attacking those first which were trained on trellises. It then passed the Pyrenees and laid waste the vineyards of Spain. In 1851 it invaded Italy; and in 1871 it was first observed in this colony. The first notice of it is made by Mr. John Smith, of Riddell's Creek, in a letter, dated the 11th December, and published in the *Australasian* of the 16th December 1871. Mr. Smith, in his letter, remarks:—"I saw it (the oïdium) in different gardens about Melbourne last autumn, but it was then too late in the season to materially injure the crop of grapes. But if the vines are attacked by

it just now the growers need not expect to have any grapes whatever this season, nor, indeed, in any future years, unless the flowers of sulphur are used at the very first appearance of the mildew on the leaves or branches." . . . . . "I hope that I may be mistaken about its appearing at this early period of the season, but from noticing it so very decidedly last year, and knowing its almost certain wide and sudden spread the following season, measures ought to be taken to arrest this destructive disease on its first appearance on the vines."

Of the numerous remedies tried for the cure of this disease, the simplest—the application of sulphur—is perhaps the most efficacious. The experience of our vine growers, however, is divided on this point. Some maintain that it is a sure specific, while others affirm that it effects little good. There can, however, be little doubt but that flowers of sulphur, if applied in small quantities at a time and in dry weather, does act curatively in this disease. Mr. Banks mentions that he could perceive no good results from the use of sulphur, when applied in wet or cold weather. The action of sublimed sulphur in the cure of oïdium is due to the formation of sulphurous acid gas by the action of the oxygen of the atmosphere on the finely subdivided particles; and as dryness and heat are essential to the oxidation of sulphur, it may be readily understood how it is that sulphur will not act curatively in wet or cold weather. Professor Mangini, in the *Industriale Italiano*, remarks:—"Baron Mandolo has conducted some extensive experiments with a finely divided earthy substance, containing sulphur, with very marked success, and at one-fifth of the cost of the sulphur remedy. According to Professor Mangini, this substance—which is known in Sicily by the name *minerale greggio*—is composed of the following constituents, viz.:—46·0 per cent. sulphur, 2·0 ditto alkalies, 11·8 ditto carbonate of lime, 4·2 ditto finely divided clay, 36·0 ditto sulphate of lime, and traces of arsenic. This substance acts by causing the oxidation of the sulphur to set in more readily, and has been used with good results both in Italy and Germany."* Sir William McArthur described, before a select committee of the New South Wales Legislature, a few years since, a combined process of sulphuring and incineration, which is briefly as follows:—After pruning, every single scrap of refuse should be collected and carefully consumed by fire, neither leaves nor cuttings being spared. The stems should then be washed with a solution of sulphur and lime, to stay the development, if not destroy existing germs. The addition of clay and cow dung to the mixture would render its application still more efficacious.

* Annalen der Landwirthschaft.

Mr. Taylor, in the report previously referred to, says—"The application of a wash to the vine branches in the fall of the year, by means of a long-bristled brush, would probably remove or modify the evil influence of fungi, as well as the germs of insect life which may be on the trunk and branches. Should the protoplasm from crushed conceptacles or spores, consequent on the friction from brushing, flow over the parts affected, the wash employed should have the property of coagulating the poisonous fluid. Weak solutions of tannic acid, carbolate of lime, and alcohol, will produce such results; probably the tannic acid would prove the least injurious to the vine."

By the application of some such solutions, the prevalence of the disease, in the next season, may be lessened; but probably the best means of preventing the spread of the malady will be to carefully burn all cuttings and leaves in the autumn, and to apply sublimed sulphur early in the spring, and also at intervals throughout the season.

APPENDIX F.

FLUKE OR LIVER ROT IN THE SHEEP.

BY THE SECRETARY FOR AGRICULTURE.

Of all the diseases to which the sheep is liable, perhaps none causes greater mortality in that animal than "fluke," or, as it is likewise designated, "liver rot." In England the deaths, resulting from this disease alone, reach the high annual average of nearly half a million; and there is reason to fear that the mortality during the past few seasons in Victorian flocks has not been far, if anything, short of that number. The loss which this annual calamity occasions our flockmasters must be very considerable; and, unfortunately, it appears to be ever on the increase. The additional prevalence of this disorder during the past two years is due to the excessive humidity of the spring months; but its spread to previously healthy pastures is attributable to the removal of fluky sheep from unsound to healthy country.

Fluke and liver rot are enzootic diseases, dependent entirely upon local causes. My observations go to prove that, though fluke is always accompanied by rot, and rot generally by fluke, still the latter disorder is not unfrequently present when the former is absent. Fluke unquestionably produces rot; and in cases where an animal is infested with these parasites, it will, in accordance with the number present in

the ducts of the liver, suffer in a greater or less degree from chronic inflammation of that organ, which, in fact, is nothing else than rot. But chronic inflammation of the liver may exist and yet no flukes be present in the bile ducts. This disorder, which, to distinguish it from rot as produced by the existence of flukes, I will call "true rot," is dependent upon the consumption by the sheep of excess of succulent herbage in the spring months and at other seasons of the year—the abnormal growth of watery grass being due to long-continued rains. In such cases, by giving the sheep some dry food, or allowing them access to some place where they can help themselves, there is little to fear from the last-mentioned disease. True rot may be produced in sheep grazed in any, and especially rich, pasture, whereas fluke cannot be developed unless the embryo of the parasite be present.

The greatest British authority on parasites and parasitic diseases is Dr. Spencer Cobbold, F.R.S.; and as his observations are borne out by our local authority, Dr. Rowe, I will here quote the following relative to the nature, structure, and habits of the sheep fluke, from a letter written by that gentleman to the *Leader* newspaper of the 7th September 1872, and signed "A Sheep-farmer in the Goulburn District":—

"Dr. Cobbold admits that his description of the genetic relations of the parasite may, on further researches, require some modification in its minor details, yet asserts positively (and my own observations confirm his assertion) that in the main his general description will be found substantially correct. It will be necessary for my purpose to set forth briefly, and in the plainest terms I can use, Dr. Cobbold's explanation of the phenomena of fluke life. It is as follows:—Fluke is especially prevalent during the spring months, at which season of the year large quantities of fluke eggs, and sometimes probably living flukes* themselves, escape from the infected animal, through the common duct of the liver, into the intestinal canal, and thence are transferred with the dung to the pasture grounds. The eggs thus freed are very minute, not measuring more than the 160th part of an inch in diameter; they are furnished with a lid at one end of the shell, for the facility of the escape of the ciliated or hairy-edged embryo, each containing only a single germ, to be subsequently developed by a process analagous to plant-budding. The action of the dew, rain, or pools of water on this egg, assisted by the vital movements of the embryo contained within, serve to loosen the lid of the shell, and the animalcule is thus set free. The liberated animalcule, which at this stage is less than the 160th part of an inch in diameter, as soon as convenient after its release finds and attaches itself to the body of a small snail or mollusc, always abundant in wet sour-grass country; it then parts with its hairy covering and gains access to the interior of its friend. Once there, the embryo disappears, leaving the germ-bud, which now undergoes a rapid development, and being bi-sexual, begins already

* "My observations lead me to doubt the accuracy of Dr. Cobbold's statement in this respect. I do not think the living fluke ever leaves the duct of the liver; its embryo only, encased in an egg-shell of the minutest size, passes through the liver duct. I have never found a living fluke in the duct small enough to pass through."

to reproduce itself by a second progeny formed within its own interior. It is then transformed into a sac or cyst for the support and protection of its contained progeny, and in this condition is called "a nurse." These nurse-progeny are furnished with tails, and when fully developed are the well-known cercariæ. The cercariæ now migrate from the bodies of their host, and for a short time assume an independent existence, swimming about in waterholes and wandering over marshes and all moist pastures, especially whilst the dew is heavy on the grass, until at length they are taken into the stomach of the sheep or other herbivorous animals when the latter are feeding or drinking. Dr. Cobbold adds, that it is not improbable they may sometimes be swallowed when they are in the body of their host, and I incline to think that this is the usual condition in which they enter the rumen of the sheep. Be that as it may, the worms soon fasten themselves on the coat of the stomach of their new landlord, by means of a sucker provided for the purpose, and bore their way through the tissues to the liver, where they lose their tail, and become encysted for some weeks or even months before they are converted into perfect flukes as found in the biliary ducts. The bile appears to be their natural food, for in the ducts they thrive rapidly, attaining a length of one inch and even a larger size. Here, also, they begin to expel in large quantities, though only one at a time, their ova, which escape by the common duct of the liver into the intestine, and are thus transmitted to the pastures, to be again transformed into fluke by the process already explained."

The symptoms of fluke are briefly the dropping off of the wool, the development of watery tumours in the intermaxiliary space, the yellow tinge of the visible mucous membranes, namely, the eye, lip, &c., the emaciated condition of the animal, and the tendency to dropsical effusions and swellings. The disease is confined to wet and generally low-lying lands, but may be developed on otherwise healthy pastures in unusually wet seasons by the introduction of unsound sheep. There is an inclination with some people to infer that, because Australia and England are on opposite sides of the globe, things generally in this country are topsy-turvy compared with things in England; and on this hypothesis they endeavor to explain the existence of fluke in rangy country. This is an erroneous inference. Certain conditions are necessary for the growth and development of the fluke—supply it with those conditions, and it will mature, whatever may be the position of the pastures. Besides, fluke is perhaps no less frequent on high lands in England than in this country, as all those who have had experience of this disease on the Cotswold Hills know, probably to their cost. There is perhaps no more fluky spot in England than the neighborhood of the seven springs, the principal source of the Thames, yet this is situated at a high elevation of the Cotswolds.

Of the various substances applied in the treatment of fluke, common salt and sulphate of iron have been most generally used. But to attempt to cure sheep, badly affected with these parasites, is folly, as this is

probably beyond the limits of possibility. Prevention is better than cure in this disease. The best preventive is the removal of diseased sheep, in the early stages of the malady, to healthy saline pastures, and none are better than our salt-bush plains. Professor Simonds, in his comprehensive paper on fluke, published in the twenty-third volume of the Royal Agricultural Society's Journal, thus speaks of the action of common salt and sulphate of iron in the treatment of fluke:—"We have the authority of eminent chemists for saying that, *even when solutions of salt and sulphate of iron* are mixed together in the proportions here recommended (four parts by weight of salt to one of sulphate of iron), they undergo but little change. The products of the change are sulphate of soda and proto-chloride of iron, the therapeutic action of which, especially in the quantities in which they are formed, will not materially interfere with the undecomposed common salt and sulphate of iron. Apart, however, from the question of a partial change in the agents, we can speak confidently of the practical utility of the compound in the treatment of rot." Dr. Rowe, in his valuable letter previously alluded to, after referring to the common salt and iron remedy, says—

"Still it will not cure fluke; and how is this terrible visitor to be got rid of? I must candidly admit that the question is a most difficult one to answer, and I have, after much thought and observation, come to the conclusion that the only remedies are—1st. To get rid altogether of the sheep infected. 2nd. To burn the whole of the grass carefully on which diseased sheep have been depastured; by this means all ova deposited and a large quantity of snails and nurses would be destroyed. 3rd. To kill as far as is possible all marsupials known to be infected with liver fluke. 4th. To re-stock the pastures either with cattle or with sheep which are perfectly sound. By these means I do not hesitate to assert that, unless fresh diseased sheep be subsequently introduced, the pastures will remain free from fluke."

But, like most other disorders, fluke and rot gradually diminish with the improvements made in land. This has been most satisfactorily proved in England—land which at one time was notoriously fluky, having, by drainage, been entirely freed from that disease. Those farmers, therefore, who have prudently introduced sheep on their farms, should not only avoid the purchase of sheep from known fluky country, but also drain or fence off such portions of their farm as would be liable to produce fluke.

To limit, as far as practicable, the spread of this disease, steps should be taken in the coming season to prevent the travelling of sheep from unsound to healthy country, other than salt-bush country.

APPENDIX G.

FLAX CULTIVATION.*

In Australia, as in all newly settled countries, the energies of farmers have been directed in the first place to the cultivation of crops for the production of articles of diet. Food is man's prime necessary, and until more than enough of that has been provided he refuses to turn his attention to crops which minister but indirectly to that want. The flax plant, although affording products of great utility and of high commercial value, nevertheless supplies nothing for which efficient substitutes cannot be found. Its fibre has of late years been nearly supplanted by cotton ; and though its seed yields both an oil which is extensively used in the arts, and (in the form of "oil-cake") a highly nutritious article of food much used in Britain for the fattening of live stock, neither of these products are indispensable ; other seeds yield oil of a similar character, and in Australia the "cake" is more of a luxury than a necessary. In a country possessing such large grazing capabilities as ours the demand for oil-cake will be likely to remain low for an ndefinite period of time. Still flax has played (and will doubtless continue to do so) a most important part in the husbandry of the civilized world from a remote period of man's history. It is frequently spoken of in the Bible in terms which are held to prove the identity of the plant with that known at the present day as flax. Fine linen made of flax was used for swathing mummies in Egypt 1200 B.C. ; and finally, as regards its cultivation in classic ages, it is mentioned by several Roman writers on agriculture. Pliny enters with accustomed minuteness into its uses and the details of its culture. The information he supplies would serve as a guide to novices in flax-growing at the present day. He treats chiefly of spring-sown flax. According to other authors flax was sown usually in the autumn, in the months of October and November, when a quantity of seed equal to about 12 pecks was sown to an acre of land, whereas $2\frac{1}{4}$ pecks more were required for spring-sown flax. In both cases the land was previously well manured. The operations of harvesting, steeping, breaking, scutching, and hackling were performed by hand, apparently in much the same way as they are done in many countries at the present day. Pliny describes the

* In the preparation of this paper the following authors have been consulted, viz. :—Pliny Nat. Hist.; Wilson on Farm Crops; J. H. Dickson ; Lindley's Vegetable Kingdom; S. V. Pizey, &c.

Spanish flax as being of very fine quality, and mentions another sort, which was cultivated in Campania, whose fibres were so fine and so tough that nets were made of them to entangle wild boars, and so hard and strong as to resist the stroke of a sword. "I have seen," he says, "these snares of such fineness as to pass, with the ropes at the upper and under side, through the ring of a man's finger, one man being able to carry as many as would encircle the hunting ground. Nor is this the most extraordinary part, for each strand of them consisted of 150 threads." It is observed that modern times can show nothing to compare with this Campanian fibre; the nearest approach to it would perhaps be found in India, China, or the Eastern Archipelago; but the finest and toughest fibres received from those parts would still be far behind it. Flax is spoken of as an exhaustive crop, hurtful to the land, by all the Roman agricultural writers, and the stigma remains attached to it to the present day. Whether from that cause or some other its culture has never been popular in Britain; but as the fibre was indispensable, steps were taken by many English monarchs to ensure its production. With this object an Act of Parliament was passed in 1532 requiring that "each person occupying land fit for tillage should, for each quantity of 60 acres, sow one rood of it with flax every year." Thirty years later the quantity was increased from a rood to an acre under pain of a heavy penalty. This necessity for legislation to enforce the growth of flax forms a curious feature in its history. It shows that in spite of the extent of the demand, and the certainty of meeting a ready market at an apparently high price, the crop has not been a favorite with British husbandmen. The system of penalties must have failed in its object, for in 1691 it was superseded by legislation of an opposite character; farmers were to be "encouraged" to grow flax; and with that intent an Act was passed fixing the tithe on flax at only 4s. per acre. "In 1713 a bounty of 1d. per ell was allowed on the exportation of home-made sail-cloth, and in 1806 a bounty was offered for the importation of flax and hemp from the American Colonies." The flax crop must obviously have attained great importance in Britain during the middle ages, at which period the use of linen had become very general.

The native country of the cultivated species cannot, at this remote date, be determined. Asia, whence so many of our cultivated plants have come, is usually considered the birthplace of flax. According to Lindley, "it occurs in Britain only where cultivation has been practised, whence it may be doubted whether it is really indigenous. It is found abundantly, as if in a wild state, in many other parts of Europe; but

modern inquirers seem to be of opinion that it came originally from the East. Be that as it may, it is certainly capable of bearing any degree of cold which is known in the climate of Britain." It would be unsafe to allow this last observation to stand unqualified. Flax is peculiarly subject to injury by frost ; although the plant is not killed thereby, the value of the crop is liable to be seriously impaired. Spring frosts, occurring just after an interval of warm weather, have oft cut the tender tops of the plants.

The flax cultivated as a farm crop is known to botanists as *Linum usitatissimum.* Of this there are two distinct kinds, viz. :—

1. The spring flax (*Linum humile* or *crepitans*), which is sown in April, and is more dwarf and inclined to branch. This, which the German farmers call Springlein and Klanglein, has larger capsules, twice as long as the calyx, bursting with considerable elasticity when ripe, and paler seeds than the other.

2. The winter flax (the true *Linum usitatissimum*), which is sown in October. This has smaller capsules, not bursting with elasticity, and scarcely longer than the calyx, with seeds of a much darker brown. It is *Lin d'hiver* of the French, the *Winterlein Schliesslein* or *Dreschlein* of the Germans.

"These distinctions," Lindley observes, "have not attracted much attention in this country (Britain), but they seem to be of practical importance. The latter, for instance, in exclusively used in Austria, in those districts where snow lies so long on the ground in the spring that the summers are too short for the profitable cultivation of spring flax." In England, Riga, or home-saved seed from the Riga flax, is generally preferred ; but Lindley does not say to which of the above varieties it belongs. There can be little difficulty in identifying many of the samples exhibited at Victorian exhibitions. The fine large bolls, branching heads, and comparatively dwarf stems, are those of the spring flax. The seed received from India nearly answers the description above given of that of the winter variety ; it is of a dark-brown color ; but it is questionable whether the darkness is not in some measure due to the age of the samples. Over the continent of Australia is extensively distributed a perennial species of flax, bearing also a blue flower like that of the *Linum usitatissimum*, but of much smaller size, and when growing in good soil, throwing its stems to a height of five or six feet. Many years ago thousands of acres might have been seen in the Richardson country, the height varying from one and a half to three feet. The fibre is much finer than that of the cultivated varieties, and the seed too small to be of any great value commercially. On the other

hand, the cost of growing the crop would be so trifling that the produce might be profitably sold at a comparatively low price. The abrupt termination of the fibre at the lower end, caused by the crop being mown instead of pulled, would somewhat deteriorate its value; a market, nevertheless, may be found for any quantity of such produce at proportionate rates. The extra length of the staple, its fine and silky nature, would probably lead to its application to some special use, which, in process of time, might impart to it additional value.

Exhaustion and Compensation.

"Flax is a very exhaustive crop." Thus wrote the Roman agricultural authors; thus has flax been stigmatised in all ages. Maize also is very exhaustive; oats, wheat, and potatoes hardly less so. Every crop removes from the soil a portion of the elements of fertility; the heavier and better the yield, the larger the amount of these elements abstracted. No farmers are more fully cognizant of this than those who are settled on the lands of Australia—those who have so long practised the colonial system of cropping year after year with cereals, and have neglected wholly to make compensation for the robbery. Flax, then, is exhaustive, just as any other crop would be were the whole structure of the plants comprising it removed, and nothing in the way of manure applied. In the case of cereals the stubble, with the root, always remains; of the flax crop nothing is left. The root is an important portion of the crop, except when the seed only is the object of culture. But is the flax essentially an exhaustive crop? Sir Robert Kane, from whose paper a quotation has already been made, shows conclusively that the fibre—the most valuable portion of the flax plant—contains none of the "materials" of which the soil has been deprived. "The flax crop differs from other crops in this; that the value of oats or potatoes, and all food crops, depends on what they take out of the ground; whilst the valuable part of the flax is the fine fibre, or thread, which *has taken nothing out of the ground.* If you burn away a bundle of flax stalks it will leave behind a large quantity of white ashes, which consist of the different substances which the plant took out of the ground; but if you burn away a bundle of *well dressed flax* it will leave *no ashes.* They have evidently been carried off with the waste parts of the plant in the steeping and scutching. They are thrown away; and yet they are the materials of which the plant has robbed the soil, and which should be given back to the soil in order to keep up its fertility. To the practical farmer it is, therefore, of the greatest importance to recollect this principle, that the

fibre, or valuable part of the flax, is not formed by the exhaustion of the soil, but the materials which the plant takes out of the soil are all found in the steep-water and the chaff; and that if these be returned to the soil they will restore its fertility, and that thus the flax crop may be rendered one of *the least injurious to the ground and most remunerative to the farmer.*" These remarks refer to flax grown for the fibre alone, and not to crops that are permitted to ripen, or partially ripen, their seed. This point Dr. Kane thus explains:—"When the crop is grown for food or for seed, when this seed is separated by rippling, then it becomes like wheat or any other food crop. The formation of the seed takes from the soil nitrogen and phosphates, which are consumed in use, and cannot be returned to the soil; hence the economy of the residual flax products, as manure, refers to the crop grown for fibre, and does not extend to its growth for food or seed; these, like wheat, should pay, independently, for the good they take out of the land." And that the seed will so pay has been proved beyond doubt. The yield of seed in South Australia has been from 15 to 20 bushels per acre, which, at 6s. per bushel, the current wholesale price in that colony, would purchase more than sufficient manure to compensate the land for the loss which it sustained in the production of the seed. The seed itself is a most valuable source of manure. The whole seed, and the residuary product, after the oil has been expressed, and which is familiarly known as oil-cake, are excellent feed for cattle: the resulting manure is the strongest and most effective of all those produced upon the farm. The value of the steeping-water has been proved by many carefully conducted experiments. Its effects, however, were so marked, both in the succeeding potato and oat crops, upon the farm of Mr. Samuel Loudon of Hanel-tonbairn, that in stating his opinion of its utility he said: "Had I no other means of procuring it, I would pay for the carrying of it to my fields in tin cans." It had more than doubled the yield of potatoes and oats upon the land to which it had been applied; "nor was the effect confined to the potato crop: it was easily discernible in the succeeding crop of flax." Flax, therefore, need not prove injurious to the land in greater degree than any other of the crops that are ordinarily grown upon the farm. If the soil be permanently robbed, the fault will be, not with the crop, but with the system of husbandry.

In confirmation of the foregoing statement, it may be mentioned that Mr. Edw. Henty, of Muntham, who has grown flax for four years, has found the steep-water one of the most valuable applications for grass land.

The Soil.

There is probably no crop besides flax which affects and succeeds upon so great a variety of soils. It will grow upon almost any soil in which its roots can ramify freely and penetrate a considerable depth. The mechanical condition of the soil is of the first importance, and for that reason soils of a friable nature are found to produce the best crops. Strong clays, on the contrary, although possessing a great wealth of fertilising elements, are not adapted for flax. In this country soils which are naturally over-drained, as when a substratum of gravel is found at no great depth, will also not be likely to suit it. Deep and fine tillage, and freedom from weeds, are of greater moment than the quality of the soil. With reference to this item of flax husbandry, some information of value may be acquired from a perusal of the following extract from Sir Robert Kane's paper on the subject, which is quoted approvingly by Mr. J. H. Dickson, a flax dresser and recognised authority on flax culture :—

"The composition of the soil in which the cultivation of flax may be best carried on, being a problem of the highest practical interest to this country, the Flax Improvement Society of Ireland, in pursuance of their laudable object in promoting this branch of industry, commissioned me to make analyses of some soils which had produced remarkably good flax. The soils were light clay loams, and afforded the following results, which I extract from the report of the society :—

	No. 1.	No. 2.	No. 3.
Silica and silicious sand	73·72	69·41	64·93
Oxide of iron	5·51	5·29	5·64
Alumina...	6·65	5·70	8·97
Phosphate of iron	·06	·25	·31
Carbonate of lime...	1·09	·53	1·67
Magnesia and alkalies, with traces of sulphuric and hydrochloric acids	·32	·25	·45
Organic matters	4·86	6·67	9·41
Water	7·57	11·48	8·73
	99·78	99·58	100·11

The organic matter in the soils was rich in nitrogen, their fertility is therefore, from the analyses, easily understood. "These soils are from the neighborhood of Markethill, Tanderagee, and Armagh, where flax, equal to the best Belgian, has been procured." The land is adapted for barley, not so well for wheat, and has been deeply worked by small farmers by means of the spade. The composition of some of the most

noted flax soils in Belgium may be usefully studied; the following are given by Professor Wilson:—

	Dussell, near Antwerp.	Pays de Waes.		
		Courtrai.	Lakeren.	Ypres.
Silica	92·78	87·04	91·8	86·47
Alumina	1·11	1·52	1·22	1·57
Water	2·03	3·8	1·85	2·92
Organic matter	2·74	4·48	3·45	5·78

In referring to this tabular statement Mr. Wilson remarks on the very wide range of soils in which flax is grown, "Sands, sandy loams, light and heavy clays, gravels, chalks, marls, alluvial and warped soils, even reclaimed marsh lands, peats and moors, are all to be met with under cultivation, and under ordinary circumstances producing a crop. The classes of sandy loams and of alluvial soils, natural as well as artificial (warped) however, appear to be those best suited to its cultivation. In this country (England) we rarely meet with it except on the better description of soils, and those in good condition. In Ireland large crops are sometimes obtained on peat-bog lands with a clay substratum. The plant delights in an open soil, through which the rainwater may freely percolate, as its roots are of a fibrous character and extend laterally and vertically to a considerable distance, frequently from two to three feet. All the conditions required for its successful cultivation are, that the soil be deeply tilled, in good heart and good tilth, well drained and well cleaned."

Seed and Sowing.

The Chamber of Manufactures at Adelaide, whose efforts to advance the industry of flax growing have been of a most practical kind, imported seed from Riga, which they distributed freely amongst farmers who expressed a desire to experiment in its culture. Seed of the same variety has, in accordance with the wishes of those who purpose engaging in its growth, been ordered from Europe by this Department. The Riga seed is highly esteemed both in Belgium and Ireland. The flax growers in the former country are accustomed to procure fresh seed from Riga every second year. This is sown not to produce the principal crop of fibre, but to furnish home grown seed for use the following year or years. In some parts of Ireland also it is customary to sow a small quantity (a peck or so) of Riga seed every year with the above object—that of providing home-grown seed for the principal crop. In that

climate, seed of two or three years' old is found most desirable for sowing, as new seed, from containing "so large a proportion of fresh oil, gives the plant a too luxurient and irregular growth ; owing to which it produces more coarse, woody, and unsuitable parts than fine flax fibres." The author of this statement addresses himself also to the question of the assumed degeneracy of the plant, in consequence of its being grown upon the same farm year after year from the same seed. "Degeneracy is not perceptible even in the second year ;" a virtual admission that flax is liable to degenerate. The custom of exchanging seed or procuring fresh seed from a distance and from a soil of a different character is very prevalent in those districts of Ireland which are famous for the growth of good flax. The same plan having proved advantageous applied to wheat, potatoes, and other farm plants, it will be prudent to follow it here with regard to linseed, and to watch narrowly the result. A comparison between the produce of the Riga seed, originally imported to South Australia, which has been "sown so frequently as to have become almost of a South Australian type," with that of the new Riga seed now expected from Europe, will probably afford some data for conclusions with regard to the supposed liability of flax to degenerate. We hear nothing of its degenerating in Russia ; it may possibly not do so here.

The time of sowing and the quantity of seed are points of great practical moment. In the northern flax districts of South Australia, the custom is to sow in the autumn—from nearly the end of April to the end of May. In the southern parts of that colony, "it is generally preferred not to sow later than the middle of June, if only for one reason—it pulls more readily in this season than that sown later. There is another advantage in early sowing, viz., that the flax harvest can be finished before the grain harvest begins ; a late-sown crop, on the contrary, would ripen just in the height of the grain harvest, when hands of all kinds are scarce and labor consequently dear. The probable effects of frosts deserve to be considered in connection with the date of sowing. In this colony flax succeeds best when sowing is deferred until the advent of warm spring weather—from the first week of August to the end of September, according to the climate of the locality. As no weeding can be afforded it is desirable that the crop grow freely from the first, in order that it may choke any weeds which may chance to spring up. Mr. Pizey, in his paper on *Flax Cultivation*, remarks :—

"I have lately been informed by a farmer at Macclesfield that he sowed a small patch as an experiment upon a piece of land overrun with sorrel—the greatest pest of the district—and he not only had as good a

show of straw as that grown at Gumeracha, but it entirely eradicated the sorrel also."

The quantity of seed to be allowed per acre will depend partly upon the season for the intended sowing and partly upon the objects for which the crop is to be grown. If for seed alone, a bushel and a quarter will suffice for autumn sowing, a bushel and a half for spring sowing. If for fibre and seed combined, the quantities should be from $2\frac{1}{2}$ to 3 bushels per acre. Three bushels are sown by many of the best growers in Ireland; but the average quantity sown per English acre in Ireland is $2\frac{1}{3}$ bushels exactly; so that many must sow much less than the average. These remarks refer to broadcast sowing.

It is very important that the seed be distributed evenly all over the land, unless it be so the crop will ripen unevenly, and the fibre will exhibit a want of uniformity and regularity which will materially reduce its value. The sample of seed also will be unequal in ripeness and in size, on which account it will be unfit for use as seed, and will be of less value than a more regular sample for crushing. It is in these results that the importance of a fine and even tilth is disclosed. In the preparation of the land great use should be made of the roll, and after sowing is done the roll should follow.

Care of the Crop and Harvesting.

The most careful of the flax growers in Belgium and Ireland are accustomed to hand-weed their crops. If such a practice were followed in this country, the cost would in many cases be equal to the whole value of the crop; nothing therefore can be done in the way of hand-weeding; the ground should have been rendered as clean as possible by the thorough course of tillage recommended. In South Australia the flax "cleans any land from weeds, so perceptibly that the patch upon which it was sown one season would be readily detected." This it would not do unless it were sown quite thickly—the most profitable course, not only for that reason, but because a thickly sown crop is superior, both in quality and quantity, to a thin one. In the case of spring-sown flax, the crop will be fit for pulling in from ten to twelve weeks after sowing; the progress of the plants during winter being slow, the autumn-sown crops require a much longer time to attain maturity. If fibre be the only object, and if the grower desire quality rather than quantity, he will carefully watch his field, and accept the appearance of the blue flowers as a signal to commence the work of pulling. When, as will be generally the case here, both seed and fibre are required, the crop must be permitted to stand somewhat longer. After the first

blossoms have fallen, the changes in the condition of the plant occur rapidly, and the progress of the crop must be carefully watched, in order to catch it at the exact time when a fair quantity of seed can be secured without much injury to the quality of the fibre. The first formed seed bolls should be daily examined. The seed at first will contain fluid matter, which in the course of a few days will acquire solidity. At that time the seed will be of a deep green color, changing in a few days later to olive green. It is when the seed is in the former condition that the Belgian farmers commence harvesting ; in Ireland and England the crop is usually allowed to stand until the earliest seed has attained the olive-green stage. The difference in the quality of the fibre in consequence of this short delay is not great, but under the latter plan the yield of seed is much heavier. The color of the stalk at the bottom undergoes a corresponding change, which is, by those who are desirous of producing a good quality of fibre, very carefully watched. As soon as the bottom of the stalk becomes yellowish, which it will do when the early seeds have attained full size and have become of a dark green color, it will be prudent to commence harvesting, especially if the extent of crop be large. Unless an early beginning be made, the progress of pulling may not be finished until a great portion of the crop has become riper than desirable. In the event of the crop being required for seed only, it may be permitted to stand until the earliest bolls have become fairly ripe. The grower will observe that flax, when fully ripe, is apt to discharge its seed from the capsules; it will be necessary therefore to take the crop early enough to prevent a loss from this cause.

The only proper way to harvest flax is to pull it. In the northern flax districts of South Australia the crop is sometimes mown, and Mr. Roediger, a grower, in treating on this, observes—"It is of no consequence whether the flax is pulled out or mowed so long as the straw lays regularly." For ropes and such common purposes, it may not be important, but the bluntness of the mown end of the fibre renders it less adapted for spinning ; the loss of fibre also amounts to from fifteen to twenty per cent. The work of pulling is thus performed. The workman grasps with each hand a small handful of flax just below the seed vessels, drawing it out of the soil and laying the handfuls across each other. In Ireland, the crop remains in this position for a day or two ; but in the event of hot winds a short weathering only will be necessary. The handfuls ("beets") are then taken up and tied in sheaves, the band being placed below the seed-heads, the butts of the sheaves being left as open as possible. "It is important," says Mr. Dickson, "to keep the root ends even, like a brush, as, in the process of scutching, there is

much less waste, and not only will the farmer benefit from additional yield in the weight of flax, but the more even it is in the ends the more disposed spinners are to purchase it." The sheaves are "stooked" in a circle of five or six, the butts being well spread out, so as to admit the air freely to their centres. When properly dried, the crop may either be stacked or carted away to undergo the processes of "rippling" and retting. The fibre is considered to be greatly improved by stacking the crop for at least a year. When that course is intended, the seed may first be rippled off. In this country such a course is necessary in order to preserve it from mice. In South Australia, as we learn from Mr. Septimus V. Pizey, Honorary Secretary of the Chamber of Manufactures, the growers sell the straw to the millowner, the seed given in, at prices ranging from £2 10s. to £3 5s. per ton according to quality. In such cases the labors of the grower are at an end. He is not troubled with "rippling," "retting" or "watering," "grassing," "breaking," and "scutching," and Mr. Pizey thinks the plan of selling the crop whole "the only one that is likely to succeed commercially here, leaving the millowner to take the after management." He adds, "the pulling and housing will give more employment for the younger branches of the family, and a mill in the district will give untold wealth of labor and wages, besides giving the colony other two extra staples of export in fibre and oil. It would give the farmer another string to his bow in the feeding of cattle on the cake, and a constant supply of manure for his farm." . . . "It costs about 5s. an acre more to plant than wheat, and about 30s. to 35s. per acre to pull, tie, and stack ; but if these prices are high, the returns have always justified them ; and spent in the immediate neighborhood, you will perceive an indirect advantage again returning to the farmer by this very means." Before quitting the subject of pulling, it will be right to mention that Professor Wilson advocates mowing, and in support of this recommendation alleges that the portion of the stem above ground is the only one which affords useful fibre, the root portion being removed in the process of scutching. It thus appears that on this important practical point Professor Wilson and Mr. Dickson are at variance. The question for our growers is after all a simple one ; if the enhancement in the value of the pulled crop is not equal to the cost of pulling, the propriety of using the mowing machine is at once affirmed.

Rippling.

When the grower intends to dress the fibre, instead of selling the crop as stacked, the first process is that of separating the seed from the straw. Whilst the straw is flexible, *i.e.*, before it has been rendered hard and

dry by having been stacked for a considerable time, the seed-heads, or bolls, are commonly removed by a process called "rippling." A rippling comb is not unlike a coarse "hackle." The teeth, which are from 15 to 18 inches long, and tapering to a point, are set in a block faced with iron, at about a third of an inch apart at the base. The comb is fixed firmly to a bench, on either side of which sits a man, who takes a large handful of the flax by the base of the stems, and, spreading out the heads fan-shaped, draws them through the teeth of the comb. The bolls are by this operation detached from the stems, and fall below, where they are usually received on a sheet. The two ripplers use the comb alternately; whilst one is taking a fresh handful, the other is drawing his through the comb. The rippled straw is tied up in bundles again, care being taken to keep the bottoms of the straw perfectly level. When the straw has become very dry, the fibre is liable to be injured by rippling; the process of beating is then resorted to. The bundles are held by the left hand upon a bench or table, and the heads are struck with a "bat," which breaks the capsules and liberates the seed, together with the greater part of the chaff. The bolls (seed and chaff) having been removed by one of these processes, they must be thoroughly dried before they are placed in bulk. In this country the weather is usually fine at the season when this work will be in progress, so that difficulty will rarely be experienced. Rain should carefully be kept off them, as the effects of a soaking would be to cause the chaff to adhere to the seed and to spoil the sample. The winnowing may be performed at leisure times.

Retting or Steeping.

In West Flanders, it is said, the steeping is carried on as a distinct and separate branch of the flax industry; very few of the growers themselves undertaking that primary act of preparation of the fibre, while many send their produce a considerable distance to be steeped in some of the more renowned streams. Of these, the river Lys has the highest repute; Professor Wilson therefore takes the practice followed in that river as the best standard for comparison and example. The river "possesses a considerable depth of water, with a very slow motion, both favoring a regularity of temperature, upon which probably its high repute is mainly based, as analysis does not give any indications of its constituents possessing any peculiar properties, or indeed being different from those of other slowly running streams. The commencement of the steeping season (the flax having been in stack since the previous harvest) is determined by the temperature of the water; towards the end

of April or beginning of May is the usual period, and it lasts until the end of September, during which time the work is in full operation, giving employment to a great number of people. The whole process may be briefly described as follows:—The flax to be operated upon is placed in bundles or sheaves, loosely bound, on a sparred frame or crate made for the purpose, from 12 to 15 feet long, from 8 to 10 feet wide, and from 3 to 4 feet deep, the bars being rounded off at the sides and about 4 inches apart. The bundles are arranged in rows, the buts of one coming next to the heads of the others; the whole are then firmly fastened down by cross pieces of stout wood at the top, and the frame is sunk in the river to the depth of about 6 inches, by means of suitable weights attached. In a few hours the straw has become well charged with moisture, and a natural fermentation is immediately set up. In a few days bubbles of gas begin to ascend, and convey to the surface a scum of decomposed matter, which, directly it is seen, gives the operator notice that disorganization of the tissues is proceeding, and that constant observation and care are now needed lest it proceed too far and injure or destroy the fibres of the flax, which it is the object to obtain. As the process of fermentation and consequent disorganization goes on, the swelling of the straw and tendency of the mass to float gradually subsides, and the crate or frame begins to sink deeper into the water. This at once indicates that the decomposition has advanced quite far enough, and that it must be arrested, or injury will ensue. To test this, the frame is raised and a few straws withdrawn from the mass; these are broken in two places a short distance apart, and if the woody part will then separate so as to be pulled out by the fingers without breaking the fibres of the flax, or drawing any of them out with it, then the steeping has proceeded far enough, and the flax should be at once withdrawn from the frame, or injury will ensue. If the steeping be allowed to be carried too far, the fibre becomes weak and soft, and if it be not carried on far enough the fibre is always harder and less pliable, and a greater proportion is lost in the process of scutching. This particular period is therefore one of great anxiety to the operator, as upon his judgment and care the quality and yield of the straw entrusted to him materially depend. He watches the first indications which experience has taught him to rely upon, and then tests the progress of disorganization by drawing a sample of the straw every four hours, until he finds that it has reached the desired condition; and the object of the operation of steeping is effected. The frame is then hauled up to the surface, and a man goes into the water and carefully hands each bundle separately to others on the bank, who set them up in long rows for the water to drain from

them. The following day they are usually ready for drying; the bundles are then opened and the straw spread out thinly on the ground, which is always kept in grass for that purpose. They remain on the ground generally about eight or ten days, during which time they should be turned three or four times, especially if rain falls during the interval. When quite dry, on breaking the straw it will be seen that, owing to the absence of the cementing extractive matter, and the difference in the contraction of the ligneous and fibrous portions, these are now completely detached from each other, and may be separated without much difficulty, which is the next operation the straw has to undergo before the process of preparation is complete." Enough of the principles involved in the practice of retting or steeping is disclosed in the above description of the method of steeping in West Flanders to guide those who have not a slow-running stream at command, and who, from this cause, or the absence of any water except rain water, are compelled to resort to pools or tanks. The quality of the water is of the first importance; the softer the water the better. Brackish water is wholly unfit for the purpose; the presence of salts of lime and of iron is very injurious; they retard fermentation and affect the fibre. In this country the process of fermentation proceeds so rapidly, owing to the comparatively high temperature of the water during the summer months, that great watchfulness is required lest the retting proceeds too far. Amongst the communications received by this Department is one in which the writer details his experiences. Five days and nights were a sufficient time for the completion of the process of retting in a waterhole through which there was a slight current. The same experimenter has found that three days are amply sufficient in fine summer weather for drying the flax after retting, and that a longer exposure on the ground only serves to weaken the fibre. These practical points, each grower who elects to carry on the processes of retting and drying will have to determine from his own experience. The whole of the above plans and processes, it will be observed, are dependent upon natural conditions, and are therefore quite out of keeping with the mechanical spirit of the age; and yet, until less than thirty years ago, no other mode of treating flax had been generally adopted. In 1846 a process known as Schenck's was patented, and it is that which is now chiefly used in Ireland at the "retteries," of which some thirty are said to be at work. The invention consists of the use of hot water; the temperature being within "the control of the operator, who can regulate the action of the steep according to the quantity of flax operated upon or the quality of the article he wishes to produce." An important saving in time is effected, from seventy-two hours for

the finer qualities to ninety-six hours for the coarser only being required, instead of from two to three weeks. The work, too, can be carried on all the year round instead of only during the summer months, and a more regular and certain fibre can be obtained. The temperature of the steep is kept between eighty and ninety degrees. Upon a close comparison of its results with those of the common system, the yield of fibre was found to be considerably increased ; the fibre was also stronger, and the linen made from it could be more easily and perfectly bleached. In England lately a company has been started under the title of "The Colonial and Foreign Fibre Company," to work a new patent process of extracting fibres from plants of various kinds, but this Department has not yet been informed whether flax is one of the articles with which the company proposes to deal. Other improvements in the methods adopted for the separation of the fibre have been patented ; one by Watts in 1852. "The straw, deprived of its seed-bolls by passing through smooth iron rollers, was placed in bundles in a steaming chamber, the upper part being formed by an iron tank containing cold water and acting as a refrigerator." Steam at a low pressure was blown from the boiler into the lower part of this chamber, and, passing upwards through the flax, steam came in contact with the cold-water tank at the top, by which it speedily was condensed and trickled down again through the straw in the shape of boiling water, dissolving out and carrying away with it the extractive matter. An improvement on Watts' process was made by Buchanan, who recognizing the injury done to the fibre by the high temperature of the steam, submitted the flax only to the action of hot water at from 130 to 180 degrees of temperature. The results though apparently good, failed to establish either of those new processes. It is needless therefore to describe them further.

Breaking and Scutching.

These are the processes by which flax which has been steeped and dried is rendered fit for the purposes of the manufacturer. The old methods of performing these processes by hand are not likely to be adopted in this country; they need not, therefore, be described. Machinery is now constructed by which flax is broken, scutched, and finally hackled in a much better way, and at a tithe of the cost incurred in producing the same results by hand. In South Australia, as has already been mentioned, the farmers get rid of the crop—the straw and seed together—after mowing and stacking it. When it is found necessary to have fixed establishments for extracting the fibre, this practice must still prevail. An alternative course has been opened

in this colony by the manufacture of a breaking and scutching mill, which may be removed from farm to farm in the same manner as thrashing machines are now habitually done. One of these machines has been manufactured by Messrs. Thos. Robinson and Co., Elizabeth street, Melbourne, for a gentleman in the Western district, who has grown flax for four years, and has all the straw in stack. The combined machine costs from £40 to £50; it should be made for the former sum, and doubtless will be sold at that price when a demand has arisen. The use of such a machine offers the only opportunity for growers to retain the flax in their own hands until the fibre is roughly dressed. By the permission of Messrs. Robinson and Co., the following description is appended :—

"DESCRIPTION OF FLAX BREAKING AND SCUTCHING MACHINE.

"This machine consists of a strong frame made of blackwood, with scutching board or stock fixed at the side of frame ; the scutching arms or beaters are fixed on the first motion shaft, which revolves at the rate of about 120 revolutions per minute ; and upon this shaft is a pinion fitted with a clutch for throwing in and out of gear the breaker, which consists of a fluted or toothed roller, about 18 inches in diameter and 18 inches long, with two small fluted or toothed rollers about 4 inches diameter and 18 inches long, constructed so as to receive a reciprocating rotary motion, whereby the straw is led through by degrees into the machine. The rubbing and crushing action thoroughly breaks and loosens the 'boon' or 'shove,' and what remains adheres so lightly that a slight scutching clears it, and thus a large percentage of unbroken fibre is obtained. It requires about one horse power to drive it."

APPENDIX H.

THE AGRICULTURAL AREA OF THE GOULBURN VALLEY.

BY THE SECRETARY FOR AGRICULTURE.

On Thursday the 23rd January I proceeded to Seymour, with the intention of making a tour through the North-Eastern district; but, after studying the map to ascertain whether it would be most advantageous to journey up the Goulburn to Mansfield, and from there strike across country to Oxley Plains and Wangaratta, or whether to follow the river to its junction with the Murray, I decided upon taking the

latter route. This done, I set out for Tabilk. In the immediate neighborhood of Seymour settlement is comparatively scarce, unless it be on the low-lying land near the river's bank. True, there is the township with the population resident therein; but when I make use of the word settlement, I mean it to infer settlement on the land—in short, agricultural settlement. On leaving Seymour the soil to the right of the road is gravelly and of little worth for tillage, but to the left it is of better quality. However, when Seymour is left a short stage behind, the road suddenly enters upon a succession of stony rises, which support nothing but the coarsest kinds of grass and stunted meanly developed gum trees. Land of the above character is of no value for agriculture proper, and this is rendered the more apparent by the scarcity of population in the locality.

A short tract of this class of country is traversed ere the pits which have been opened to supply gravel for the second section of the North-Eastern Railway are met with; but it is not until these have been left some distance behind and Mangalore is reached that the fertile flat which has its beginning at Avenel, and stretches out on both sides of the Goulburn to its junction with the Murray, opens out before one. Here the farm homesteads to be seen on all sides at once pointed to a change in the character of the soil. Cultivation paddocks were general, and the naked stubbles (for the harvest had only recently been garnered) bore testimony to the crop having been already gathered in—a harvest whose yield, judging from the number and dimension of the stacks, bade fair to equal the estimates made while the crop was still standing.

The area of land suitable for tillage in this district is very considerable. As already stated, it stretches from Avenel to Echuca, but its width is various. I will give a general idea of its boundary, from which an estimate may be made of its extent. On the south it may be said to be bounded by that portion of Hughes's Creek which flows through Avenel and empties itself into the Goulburn River. From this point to Murchison the good land is principally confined to the east bank of the river, and may be said to be bounded on the west by the Goulburn, and on the east by the line of railway between Avenel and Violet Town. A few miles north of Murchison the agricultural area widens, and from Toolamba to Echuca its western boundary may be fixed by a line drawn from Rushworth through Cornella Creek to Echuca, and its eastern by a line projected from Violet Town through Mount Major to Katandra on the Broken Creek, and from there along the creek to the point where it joins the Murray. The whole of the country within the above boundaries, with the exception, perhaps, of a

small tract of rising ground near to Mount Major on the east, is one continuous flat, clothed with boxwood timber and occasional grassy plains. These vary in extent and increase in size as one proceeds northward. The soil is all of one character, and, judging from its general appearance, I, though no geologist, am disposed to attribute its origin to a deposit of recent date. When I say that the soil is of one character, I speak generally. True, it does vary a little ; for example, in some places it is slightly more sandy, and in others, where water has lain during the winter months, it is less rich in color. Again, where the country is timbered, the soil is all good ; but the plains, except the small ones near to the southern extremity of the district, have only a low agricultural worth. It is difficult to define the cause, but it is probably due to want of organic matter in the soil and continued exposure to a hot sun. The more densely timbered the country the better the soil; and as water may be obtained on any portion of the land at depths varying from 50 to 100 feet, there is no need to seek a river frontage.

The surface soil throughout the entire district may be described as a light chocolate loam, varying slightly in color and consistency with the locality ; the subsoil is a deep, clayey, yet not too tenacious, marl. A subsoil of this nature has a twofold action. It serves to retain the moisture, and it serves also to keep the land cool in summer ; hence the reason why in this district oats grow so freely.

The system of farm management practised throughout the district may be described as the grain-growing. The crops chiefly cultivated are wheat and oats, and these are taken year after year off the same land, evidently without a thought of the deleterious consequences arising out of such a system of cropping. True, the district is admirably adapted to the production of grain, and perhaps will not be surpassed in this particular by any other part of Victoria ; but this even is not sufficient reason to warrant an exhaustive system of management. The worst feature, however, in the farm management of this district is the wilful waste made of straw. This, in most instances, after having been put through the machine, is carted out into the paddocks, placed in heaps, and burned. This is a most suicidal practice ; and it will be well for farmers to remember that when straw is burned it leaves behind nought but ashes, which consist of insoluble salts, only sparingly assimilable by the plant. If farmers would only permit the straw to lie in heaps to rot, and then cart it on to the land, they would at least return to it a portion of the plant food of which it had been robbed ; moreover, only the one expense of carting would be incurred. It matters not how

fertile land may be, it is sure one day to become exhausted if grain crops are repeatedly and without intermission taken off it.

The impression is fast gaining ground that stock-breeding, more particularly as regards sheep, will have to be pursued in connection with tillage. Some farmers do already keep a few head of horned stock and are prudent enough to preserve their straw, and so to place their straw stacks that the cattle may have uninterrupted access to them, a privilege which is not unacceptable to stock even during the dry summer months. The want of making proper provision for the comfort of stock, both as regards shelter and a sufficient supply of food, during the winter months of the year, is one of the chief shortcomings in colonial farm management. Stock-breeding forms the basis of proper farm management, and without the introduction of stock on farms none but an exhaustive system of cropping can be pursued. It is well to vary grain-growing with a crop of sugar-beet, or even with a crop of flax; but this will not solve the difficulty. The sugar-beet or other green crop must be consumed upon the farm, and the straw of the grain crops trodden into manure and returned to the soil, or their equivalents brought back on to the land in the form of artificial fertilisers, ere the difficulty can be overcome. To vary grain-growing by taking a green crop, unless such green crop is consumed on the farm or ploughed under, brings about no real change, but only one of degree.

Suppose that a man has a farm of 320 acres of good land, and that he stocks it with a flock of 80 to 100 breeding ewes, besides horses and horned cattle—but 320 acres have been found too little for combining stock-rearing with grain-growing in this country—he would then of necessity have to grow some green stuff to carry his stock through a dry summer, and also some roots to bridge them over the winter. This would at once bring about a rotative system of cropping, which would tend to restore fertility to the soil. But suppose the 320 acres to be all virgin soil. Then, as the land is broken up, let two wheat crops be taken; let the manure made from the straw of the last two crops be carted on to the land, the soil deeply ploughed, and a mangel crop got in—mangels grow well in this district; let these be eaten on the ground by sheep during winter, and the land prepared for receiving a barley or oat crop in the following spring (land in good heart will permit of these crops being sown in spring, if got in early); let one more wheat crop be taken, and the land then laid down in grass, and let the manure made from the straw of the two last crops be applied to the pasture in the form of a top-dressing. If farmers in this district would keep the necessity for rotation of crops in view, and gradually work into

some such course of cropping as the above, they need have no fear for their land becoming exhausted.

Although the Goulburn district is not adapted to many of the crops usually grown in Great Britain and the north of Europe generally, there are few, if any, plants cultivated in southern Europe which would not thrive admirably there. The orange, fig, mulberry, peach, almond, and grape all succeed well ; and it is probable, on those farms adjoining or within easy distance of the North-Eastern line of railway, some of these might be profitably grown for the Melbourne market, the orange more particularly. A large trade in this fruit is done with Sydney ; and if the orange will pay for bringing from Sydney, it will surely pay for growing on the Goulburn and in the districts adjacent to the North-Eastern line of railway and north of the township of Seymour. The orange, when grown for profit, requires careful cultivation. It should be planted in rows, and systematically pruned, just as any other orchard tree. The space between the trees should be kept clean of weeds ; but the soil should not be too deeply stirred in the vicinity of the trunk, as the orange throws out a number of fibrous surface roots, which by deep stirring become damaged and cause injury to the parent stock. The hoe is the best implement for loosening the soil near to the trunk.

The maize is another crop which is largely imported into this colony from New South Wales, and which could be equally well grown in the district now under consideration. The value of maize as a food for stock can only be appreciated when it is seen how largely it enters into the nourishment of animals in other countries, as those who have visited the adjoining colony of New South Wales can bear testimony. Various kinds of pumpkin also should be extensively cultivated for cattle.

The wine industry is represented in this district by the Tabilk and Goulburn Valley vineyards ; but owing to the many difficulties which this industry has had to contend with, the production of wine has not gained a firm hold.

The comparative scarcity of timber, and the reckless manner in which every selector cuts down what little stands on his allotment, cannot but act prejudicially upon the climate of the locality. But the loss of the timber will not only be felt in this respect. The fences, which have not as a rule been substantially erected in the first instance, will shortly require to be renewed, more particularly when sheep-breeding is introduced into the system of farm management ; then it will be hard to know where to obtain timber for the purpose, except by carting it an average distance of twenty-five to thirty miles from the ranges.

This points to the necessity for planting live fences, a matter which farmers in this and other parts of the colony will do well to consider.

There can be no question but that the Goulburn Valley is one of the most extensive and best agricultural districts of the colony, more especially for the production of wheat; and if those who own farms there would take care of their land, and not run it out by too constant cropping, there can likewise be little doubt but that the district will be amongst the most prosperous, as well as the most extensive, of our agricultural areas.

APPENDIX K.

REPORTS OF ACTING CHIEF INSPECTOR OF STOCK, GOVERNMENT BOTANIST, ETC., ON POISONOUS PLANTS.

LOBELIA PRATIOIDES.

SIR, Williams Road, Prahran, 17th March 1873.

I have the honor to inform you that I heard of the cattle referred to in your note on last Thursday afternoon, and instructed Mr. Inspector Kyle and Mr. Graham Mitchell to proceed to Maidstone on Friday to examine and report on the cattle. I expect to receive the report to-day, and hope to lay it before you to-morrow. Mr. Mitchell is of opinion that the deaths may be attributable to a poisonous herb; he could see no symptoms of internal disease, except of the brain. An herb which Mr. Mitchell brought from thence has been sent to Dr. Mueller, with a view to ascertain whether it is of a poisonous nature.

I have, &c.,

(Signed) JOHN HUNTER KERR,

In the absence of the Chief Inspector.

The Honorable the Chief Secretary.

SIR, Melbourne, 17th March 1873.

I have the honor to hand to you the reports (dated 17/3/73) of Mr. G. Mitchell, V.S., and Mr. Inspector Kyle, relative to cattle dying in considerable numbers at Maidstone.

I have, &c.,

(Signed) G. PORTLAND,

For the Acting Chief Inspector of Stock.

The Under Secretary.

SIR, Melbourne, 17th March 1873.

I have the honor to report that I accompanied Mr. Kyle to Maidstone on the 14th instant, and made inquiries in reference to the cattle that were reported to be dying there. I made a *post mortem* examination of a red and white cow and a red and white heifer. The true digestive stomach was inflamed; there were rapid accumulations of gas in the bowels previous to death; the leaves of several plants were found in the stomachs; the membranes of the brain were congested with sanguineous effusion, which was the immediate cause of death. I am collecting specimens of the different plants for Dr. Mueller's inspection.

I have, &c.,

(Signed) GRAHAM MITCHELL,

J. H. Kerr, Esq., Veterinary Surgeon.

Acting Chief Inspector of Stock.

SIR, Melbourne, 17th March 1873.

By your direction, I accompanied Mr. Graham Mitchell, V.S., to Maidstone on the 14th instant, to inquire into the cause of the death of a number of cattle reported to be dying there, and have the honor to report that a *post mortem* of two of the cows was made (one of which had just died). The symptoms were inflammation of the true stomachs and bowels, effusion on the brain, with considerable congestion of the membranes of that organ.

I am of opinion that the cause of death is attributable to some poisonous plant which the cattle eat, and now growing abundantly on the swampy ground.

Samples of the suspected plant will be submitted to the Government Botanist for his report thereon.

I have, &c.,

(Signed) WILLIAM KYLE,

John Hunter Kerr, Esq., Inspector of Stock.

Acting Chief Inspector of Stock.

SIR, Melbourne, 24th March 1873.

I have the honor to state, with respect to the cattle at present dying from eating of a poisonous herb at Geelong and elsewhere, that this herb is pronounced to be a species of "Lobelia," which is declared by Dr. Mueller to be highly poisonous. It has been found growing in large quantities in all those localities where the mortality has prevailed. Its abundant growth during the present season may most probably be attributable to the unusually frequent rains during the summer. It is on the

commons chiefly, where the grass is scanty, that the mortality amongst the cattle appears to have been greatest.

I have the honor to submit to you Mr. Inspector Riley's report of the 21st and 22nd instant relative to this matter ; also report of Mr. Graham Mitchell and of Dr. Mueller.

The only means of saving the cattle would appear to be by removing them to other land where grasses predominate over the herb, which, when eaten in small quantities, does not seem to produce fatal effects.

I have, &c.,

(Signed) JOHN HUNTER KERR,

In the absence of the Chief Inspector.

The Honorable the Chief Secretary.

Sir, St. Helens, Geelong West, 21st March 1873.

I have the honor to report that immediately on the receipt of your instructions, to hand this morning, I went to the Town Clerk's office, from thence to the herdsman's, on the Geelong town common ; there I found that a cow had died in the night and been carted away to a bone mill. I followed it and arrived in time to see it opened ; all the parts were healthy, except the stomach, which was in a high state of inflammation, the coats all peeling off. The owner states that she appeared last evening quite well, and after coming in from the common took her food the same as usual. He has another that he did not think right, and he slit her ears to bleed her, and gave her some saltpetre, and to day she is quite well.

I went over the greater part of the common, and found the weed with the blue flower spoken of (of which I enclose a sample) growing most abundantly in places—acres of nothing else. The general opinion appears to be that it is the cause.

I went to Mr. Raddenbury, at the Botanical gardens, but unfortunately he is absent in Melbourne, but expected to return this evening. I left some of the weed for him to see, and will call again in the morning. If this is the cause, I fear there will be many more deaths.

I will make further inquiries to-morrow and report.

I have, &c.,

(Signed) JAMES RILEY,

Inspector of Stock, Geelong District.

John Hunter Kerr, Esq.,

Acting Chief Inspector of Stock, Melbourne.

P.S.—I should have mentioned that I had heard nothing of this till yesterday, when I saw the account in the paper on my return home from the country.—J. R.

SIR, St. Helens, Geelong, 22nd March 1873.

I forwarded you a report yesterday, after which I received your telegram to say that Mr. Graham Mitchell would be down to day. I met him at the train and took him over the common. We saw the herdsman, and there were no fresh cases. We took some of the different weeds growing on the common to Mr. Raddenbury, at the Botanical gardens, none of which he considered at all of a poisonous character. The one I sent you a sample of he calls a Lobelia We also showed some to Mr. Wyatt, of Frogmore nursery, and he says there is nothing at all of a poisonous nature in any of that family of plants. Mr. Mitchell has taken some with him to Melbourne, and it would be as well to have Dr. Mueller's opinion on the subject. The herdsman will report to me if any more deaths occur, and I will telegraph to you, and Mr. Mitchell can at once come down again.

I have, &c.,

(Signed) JAMES RILEY,
Inspector of Stock.

J. H. Kerr, Esq.,
Acting Chief Inspector of Stock, Melbourne.

SIR, Melbourne, 24th March 1873.

Agreeable to your instructions of the 21st instant, I proceeded to Geelong on the 22nd instant, and made inquiries in reference to the cattle reported to be dying there.

It appears thirteen head of milch cows died between the 10th and 21st instant. The common where the animals fed is covered with the poison plant, a species of Lobelia.

I had no opportunity of making a *post mortem* examination. I obtained specimens of the plant; it is the same as the plant found at Maidstone.

Mr. Inspector Riley afforded me every assistance. He appears to have thoroughly investigated the matter.

I have, &c.,

(Signed) GRAHAM MITCHELL.

J. H. Kerr, Esq.,
Acting Chief Inspector of Stock.

SIR, Melbourne Botanic Garden, 23rd March 1873.

In reply to your communication, just received, I have the honor to inform you that the weeds of which you transmit a sample, is botanically known as Lobelia pratioides, and belongs to a genus of highly poisonous plants. Hence I have no doubt that the death of the

cattle at Geelong, Maidstone, and Braybrook is to be traced to the prevalence of this herb at this season on spots very bare of pastoral vegetation. The best means for setting this question at rest would be to administer the herb to a sheep or some other pastoral animal, and to watch whether the animal thus experimented on will succumb under the same symptoms which were manifested when the cattle at Geelong, &c., expired.

I have, &c.,

(Signed) FERD. VON MUELLER,
Director of the Botanic Garden.

The Chief Inspector of Sheep.

Postscript.—I would advise that patches densely beset with the Lobelia, which is perennial, should be ploughed and then sown with the seeds of vigorously growing perennial grasses, clovers, lucern, &c.

Plate V.

LOBELIA PRATIOIDES.

SIR, Melbourne Botanic Garden, 23rd March 1873.

In compliance with your request, conveyed to me this day, I have the honor to explain, that the herb of which specimens were transmitted by Mr. M. B. Carroll, of Ararat, is phytographically known as Lobelia pratioides, an account being given descriptively of this plant in the fourth volume of the "Flora Australiensis." Nearly twenty years ago, in a report printed for Parliament, I pointed (Report 1853, page 6) to the intense acridity of the indigenous Lobeliaceæ, analogous to that of the medicinal Lobelia inflata of North America —the latter an important remedy in asthma, if carefully administered, also in chronic bronchitis and laryngitis. The geographic range of Lobelia pratioides, as far as hitherto ascertained by myself, is from near Lacepede Bay, in South Australia, to the Grampians, Ballarat, and W. Gippsland. This particular species is also known from the north part of Tasmania. The same Lobelia has been sent to me from the Geelong commons, where likewise recently many deaths of dairy cows occurred; and the Chief Inspector of Sheep has been informed that cattle have lately also died at Maidstone and Braybrook from the effect of this herb. Taking into consideration the well-known poisonous properties of the Lobeliaceæ, and observing that at various localities, by observers independently of each other, many deaths among cattle, horses and sheep have been traced to the Lobelia pratioides, I am led to think that their assumptions of the highly deleterious properties of this herb are correct. When pasture fodder is much reduced during the autumn, on places probably overstocked, it may easily occur, that the pasture animals will browse on a herb, such as the Lobelia, then still growing in moist localities, while at seasons more favorable for pasturage they will not touch the herb mentioned, or may consume it only in so small a quantity, along with other food, as not to be destructive to them. Similarly the Swainsona vetch proves here generally only dangerous and deadly when, in the heat of the summer, on dry spots, other plants largely fail on the pastures.

I do, however, not think that the dangerous properties are here restricted to this only one of the Lobeliaceæ; contrarily, we will have to guard the stock against all the species of this order of plants, of which thirteen species occur within the limits of the colony of Victoria, viz., Lobelia gibbosa, Lobelia rhombifolia, Lobelia anceps, Lobelia surrepens, Lobelia purpurascens, Lobelia pratioides, Lobelia gelida, Lobelia platycalyx, Lobelia concolor, Lobelia puberula, Lobelia pedunculata, Isotoma axillaris (a particularly large and dangerous species), Isotoma fluviatilis. The question of the noxious character of these weeds might

easily be set at rest, if a quantity of any suspicious species was administered (perhaps under the supervision of a veterinary surgeon) to various pastoral animals, for test as to the quantity causing death, and as to the remedies to be timely employed. Cases of deaths of horses and cattle caused by Lobelia inflata are on record in the United States of North America, while in West India the same results take place with Isotoma longiflora. The main active principle is Lobelin, an alkaloid liquid, which to some extent chemically may be compared to nicotin. Perhaps I may be permitted to advise that, wherever on pasture ground the Lobelia pratioides or any other species of that genus may occur abundantly, measures should be taken to plough the ground, and then to sow it with the seeds of deep-rooting fodder plants, such as perennial grasses of vigorous growth, lucern, clovers, &c.; for, although this would involve in first instance considerable expense, the final advantage of this measure would more than compensate for the expenditure incurred, as in all probability the Lobelia weed, which is perennial, would be suppressed, and the area be rendered far more productive by supplanting for a noxious herb a continuous dense growth of highly nutritive plants.

I have, &c.,

(Signed) FERD. VON MUELLER,
Director of the Botanic Garden.

The Honorable J. J. Casey,
Minister of the Lands Department.

SOLANUM NIGRUM.

Sir, Melbourne, 4th April 1873.

I have the honor to forward reports from Messrs. Kyle and Graham Mitchell in relation to the mortality among Mr. Dutton's cattle at Broadmeadows, also a report from Mr. Johnson, Analytical Chemist, on the analysis of the stomach of one of the dead cows, and from Dr. Mueller upon the properties of the plant to which the deaths are attributed. All these reports agree in the opinion that the mortality is owing to another form of poisoning, caused by the feeding on the Solanum nigrum, commonly known as the annual Nightshade.

I have, &c.,

(Signed) JOHN HUNTER KERR,
In the absence of the Chief Inspector.

The Honorable the Chief Secretary.

Melbourne, 2nd April 1873.

Sir,

With reference to your letter of the 28th ultimo, instructing me to proceed to Broadmeadows to inquire into the cause of the death of seven head of cattle belonging to Mr. Thos. Dutton, I have the honor to furnish you with the following information :—

On arriving at Mr. Dutton's farm, I observed that there was little or no grass on the land; this, Mr. Dutton explained, was owing to his having a large number (900) of sheep for a much longer period than he had intended when he purchased them, and that, in consequence of this, he had been obliged to feed his cattle on hay and straw. This would make the cattle more apt to eat any green herb which at other times they would reject.

The plant Solanum nigrum, referred to in Baron von Mueller's report, grows plentifully on Mr. Dutton's land, more especially on the banks of the Moonee Ponds. Here I noticed that it had been cropped quite short. The cattle were feeding on it whilst we were there (I expressed my astonishment to Mr. Dutton that he should allow them to do so), and the result was that, in about half an hour after this, three more cows died close together.

Mr. Graham Mitchell and self made a *post mortem* examination on four of the cattle; the symptoms were the same in each case, and showed that death was caused by narcotic poisoning. And, from the fact of these cattle having eaten this plant (portions of which were found in the stomach by Mr. Johnson, Analytical Chemist), I have no doubt but this was the cause of their death. There were no signs of chronic disease in any of those we examined.

I have found the same plant in several parts of the country, viz., the Royal Park, Brunswick, Saltwater River, Merri Creek, Flemington Cattle Yards, Custom-house yard, &c., &c.

I would suggest that the Secretary of Agriculture be communicated with on the subject, that information on these poisonous plants may be diffused amongst the farmers and stockowners, with a view to their eradication.

I have, &c.,

(Signed) WILLIAM KYLE,

Inspector of Stock.

John Hunter Kerr, Esq.,
Acting Chief Inspector of Stock.

Melbourne, 31st March 1873.

Sir,

I have the honor to report that I accompanied Mr. Inspector Kyle to Mr. Dutton's farm, Broadmeadows, on the 29th instant.

We examined the carcases of two cows that died on the 27th instant, and also the carcases of two cows that died when we were on the farm, and found the usual appearances met with in cases of narcotic poisoning, viz., irritation of the digestive organs, congestion of the nervous centres and respiratory organs, fluid and dark-colored blood, &c.

There is scarcely any grass on the farm, and the cattle were grazing on the banks of the creek where the Solanum nigrum is growing.

I have therefore no doubt that the poison plant referred to caused the death of these cattle.

I have, &c.,

(Signed) GRAHAM MITCHELL.

J. H. Kerr, Esq., Acting Chief Inspector of Stock.

Government Analytical Laboratory,
Melbourne, 31st March 1873.

Sir,

I have examined the contents of the stomach of a cow delivered to me by Mr. G. Mitchell and sent by you for analysis.

Amongst the vegetable products present, I detected a number of seeds having the size and general shape and peculiar appearance of the seeds of Nightshade, depicted page 359, *Taylor's Medical Jurisprudence*, with the same microscopical spots. I could not detect any of the structure of the plant, the whole being too much masticated.

Treated chemically by Staas' process, the contents of the stomach yielded a bitter alkaloid, giving a yellow precipitate, with chloride of gold, and a brown one with iodine solution, two tests pointing to atropine or some very allied salt (Solanin Daturin).

The plant forwarded with the stomach, Dr. Mueller pronounces to be Solanum nigrum, a well-known poison plant. There can be no doubt this was the cause of death.

I have, &c.,

(Signed) WM. JOHNSON,
Government Analyst.

The Chief Inspector of Stock, Melbourne.

Melbourne Botanic Garden,
29th March 1873.

Sir,

In reply to your communication just received, I have the honor to inform you, that the herb which produced poisonous effect on the cattle of Broadmeadows is the Solanum nigrum, called in Britain the annual Nightshade.

Plate VI.

Solanum nigrum.

It is a cosmopolitan plant, since ancient times known as poisonous and mentioned under the name of Strychnos along with Atropa Belladonna in the writings of Dioskorides already, it belonging, indeed,

with the Belladonna, Mandragora and Stramonium, to the same order of plants (Solaneæ). The most active principle of Solanum nigrum is a glucosid (Solanin), and this is most strongly developed in the unripe berries. The plant, however, acts not with the dreadful intensity of the deadly Nightshade (Atropa Belladonna), but it is far more commonly dispersed, and disseminates itself with celerity, particularly on roadsides, waste places, in gardens, &c. It being, however, an annual, it can be readily enough destroyed by weeding prior to its ripening its berries. The Solanin produces paralysis of the extremities prior to death when consumed in quantity.

I have, &c.,

(Signed) FERD. VON MUELLER,
Director of the Botanic Garden.

The Chief Inspector of Stock.

APPENDIX L.

PAPERS RESPECTING THE "PHYLLOXERA VASTATRIX," OR NEW VINE SCOURGE.

No. 1.

Sir C. Murray to Earl Granville.—(*Received 22nd June.*)

Cintra, 12th June 1872.

My Lord,

I know not whether your Lordship's attention has been called, either by the Embassy at Paris or by any of the British Consuls in France, to a new scourge that has recently attacked the vines in that country as well as in Portugal, and which threatens to be as desolating in its effects as the disease called *Oïdium*, which for some years destroyed viniculture in Madeira, and has inflicted serious damages on it both in France and Portugal, notwithstanding the partial remedy that has been discovered and adopted in the free use of sulphur. The insect which has lately been making such ravages in the vineyards, and to which has been given the name of *Phylloxera vastatrix*, seems, according to the report of those who have examined it carefully, to

be of the same species as the "aphis," long known in horticultural and vinicultural science as an insect most destructive to plants and vegetables, and it has received the vulgar names of "puceron" in France and "plant louse" or "vine fretter" in England; but the *Phylloxera*, whose ravages are now causing so much damage and apprehension, appears to be not only particularly destructive, but also very difficult of extirpation. A printed paper, from which I gather some of the observations which I am now offering to your Lordship, states (I know not whether correctly or not) that the French Government has offered, and hitherto without success, a reward of 20,000 fr. to any one who can discover an effectual remedy for the ravages produced by this insect. According to the statement of the paper above referred to, the injury inflicted by this scourge on some of the vineyards in the Douro district has been terrible, and one vineyard is specified, the average produce of which had been seventy pipes of wine, and which last year only produced one; and a certain Senhor Avelino, who was sent into that district to examine and report upon its condition, estimates the total loss on last year's vintage there at 500 pipes.

The Portuguese Government has named a commission, under the presidency of the Director-General of Commerce and Industry, to examine into the progress of this dangerous evil, and to gather from all quarters (whether scientific or practical) suggestions for the best mode of extirpating it. One French vine-proprietor reports that he has tried with some success the expedient of digging a hole round the stem of the vine which he half fills with chimney soot and then covers over with earth. If this should ultimately prove an effectual antidote to the malady, its much to be regretted that the vine-growers of France and Portugal are not somewhat nearer to London, where it could be cheaply and abundantly supplied; but if the description given of the *Phylloxera* be scientifically correct, and it is a species of aphis, it must probably, like most species of that order, be furnished with wings, in which case it would not seem likely that any substance placed around the roots could afford protection against its ravages.

Considering what a large proportion of the exports of Portugal and the south of France depends upon the fruit of the vine, I have thought it my duty to bring the subject under your Lordship's notice, in order that you may, if you think proper, desire further information concerning it to be supplied to you from other quarters.

I have, &c.,

(Signed) CH. A. MURRAY.

No. 2.

*Viscount Enfield to Lord Lyons.**

SIR, Foreign Office, 25th June 1872.

I am directed by Earl Granville to transmit to you, for your information, a copy of a despatch from Her Majesty's Minister at Lisbon relative to the appearance of a disease among the vines of France and Portugal.†

I am, &c.,

(Signed) ENFIELD.

No. 3.

Sir C. Murray to Earl Granville.—(Received 15th July.)

MY LORD, Cintra, 3rd July 1872.

A few days after sending to your Lordship my despatch of the 12th ultimo, on the subject of the ravages reported to have been committed in the vine districts by the *Phylloxera vastatrix,* I addressed a despatch to Mr. Consul Crawfurd, at Oporto, desiring him to make all the inquiries necessary in his neighborhood, and furnish me with such information as he could collect on the subject. I have received his report, and have the honor to inclose it herewith. Your Lordship will observe, on reading it, that Mr. Crawfurd seems of opinion that the fears, amounting almost to a panic in some districts, which have arisen concerning the ravages of this insect are very much exaggerated, and he attributes this very much to the recent publication of a pamphlet on this subject by Senhor Oliveira. I am inclined to agree in this opinion to some extent, for I have procured and read the pamphlet, on the inaccuracies of which Mr. Crawfurd comments in very severe terms. I am not sure, however, that Mr. Crawfurd does not underrate, as much as Senhor Oliveira may overrate, the damages caused or to be apprehended from this mischievous insect; for though Mr. Crawfurd may correctly designate the pamphlet as "a hasty and ill-judged compilation from French authorities," it does not thence follow that the authorities from whom he compiled are unworthy of credit. So far from this being the case, I am inclined to believe, from the positions which several of them filled in the Bordelais and in the valley of the Rhone, that they were men selected on account of their practical or scientific knowledge to report on the subject. With this reservation, I agree with Mr. Crawfurd

* A similar despatch was addressed to Consul-General Monson. † No. 1.

in considering both the tone and the statements of the pamphlet very exaggerated; and, moreover, as I now see that many of the articles in the local newspaper from which, as I informed your Lordship, I drew the chief materials of my despatch were based upon the contents of this pamphlet, I trust that the grounds on which Mr. Crawfurd expects that the Portuguese vineyards will enjoy an immunity, total or partial, from the scourge may prove correct. In reference to the case specially mentioned in the 6th page of Mr. Crawfurd's report, it is a curious circumstance that I have, within the last few weeks, had one precisely similar in my garden in Lisbon. An old, strong, healthy, and hitherto very fruitful vine began suddenly to wear a sickly appearance, the leaves began to wither, and to assume first a yellow and then a reddish appearance. My gardener had never seen this or any other vine in my garden attacked in a similar manner (although we are obliged to sulphur all our vines several times yearly to preserve them against *Oïdium*); so, thinking that I had received my first visit from the *Phylloxera*, I desired the gardener to uncover and carefully examine the roots, but they appeared perfectly sound and healthy, and the disease, which has destroyed this year's crop of fruit and leaves, remains a mystery. I have surrounded the roots with a bed of soot, overlaid with earth; but whether the vine will recover or die remains to be proved.

I have, &c.,

(Signed) CH. A. MURRAY.

[Inclosure 1 in No. 3.]

Consul Crawfurd to Sir C. Murray.

SIR, Oporto, 30th June 1872.

I have the honor to inclose herewith, with reference to your despatch of the 12th instant, a report upon the recently discovered vine-disease producing insect—*Phylloxera vastatrix.*

I have, &c.,

(Signed) OSWALD CRAWFURD.

[Inclosure 2 in No. 3.]

Report by Consul Crawfurd upon Phylloxera vastatrix.

The attention of the Portuguese wine-growers has not been called until the last two years to the existence of a new enemy of the vine in the shape of *Phylloxera vastatrix.*

The discovery in France of this supposed importation from America was not made till the year 1855, since which time its natural history and the effect of its ravages upon the vine plant have been industriously investigated by French entomologists and œnologues; and in the opinion of some persons the extent of these ravages has been not a little overstated.

There is little doubt, however, that, after making due allowance for the exaggeration common to those who make a long study of special subjects, the injury done by this insect to vineyards, in certain districts of France, and under certain circumstances of vine cultivation, has been considerable.

Phylloxera vastatrix is a small insect of the sub-order of *Homoptera*. The adult female only has, as yet, been discovered; it is found in the apterous and also in the winged state. The eggs would appear to be generally deposited in galls, formed by the insect on the leaf of the vine, and the newly-hatched grub finds its way to the roots of the plant, upon which it feeds.

The first symptom of the vine being attacked is the reddish-yellow colour of the leaf. No means of checking the progress of the insect has yet proved effectual.

Senhor Oliveira, junior, has quite recently published a pamphlet upon the subject, which, though a hasty and ill-judged compilation from French authorities, may, perhaps, have the effect of arousing observation on the part of the vine-growers. This work, however, is full of unpardonable exaggeration, tending only either to encourage undue alarm, or, as is more probable, to excite utter unbelief in the writer's assertions: *e.g.*, the author begins by stating that a plague has fallen upon the vine industry of the country one hundred times more destructive than the old vine disease—the *Oïdium Tuckeri*.

The food of *Phylloxera vastatrix* being the roots of the plant, it is obvious that it is only where the young and more tender roots of the vine are near the surface of the ground that they can be destructively fed upon by so small and delicate an insect.

This is proved by the experience of French observers.

In vineyards where the soil is of little depth, in those where the drainage is deficient, and, particularly, in those French vineyards where, quantity rather than quality of wine being sought for, cultivation by the plough and frequent manuring are employed, the presence of the insect has been found to be more or less accompanied by damage to the vine; for in all these cases the fine root-fibres are near the surface and within reach of the insect. The same, of course, applies to newly planted vines, which are especially liable to destruction.

On the other hand, *Phylloxera vastatrix* is never observed to attack vines allowed to creep over pollarded trees, or over trellis work; and vines so trained form, probably, nineteen-twentieths of all that are grown in North Portugal—the vines in such cases being usually well-established plants of many years' growth, with deep reaching roots. Again, in the district in which port wine is produced, although the shape of the vine is bush-like, as in France, the roots descend to a great depth in the schistose soil—a depth, as I have myself had occasion to observe, sometimes exceeding fifteen feet.

The same holds good, though to a less degree, with regard to the vines of the Bairrada district, and elsewhere in the province of Beira, where they are grown in bush-shape; and it may be observed generally of this Consular district that the wine cannot be profitably produced except in deep soils, on account of the frequency of long summer droughts, which cause the plant to send its roots far down in search of moisture.

It will easily be concluded from these facts that the conditions of the growth of the vine in Northern Portugal are by no means favorable to the development of *Phylloxera vastatrix*.

Senhor Oliveira, junior, mentions two instances of the ravages of the insect in the port wine district. In one of these cases the yield of wine was reduced from sixty pipes to eight pipes in two years, but in neither case was it clearly proved that the destruction was the work of *Phylloxera vastatrix*. The roots of the plants in the above-cited instances were indeed found to be decayed, but no insects were discovered, and no particulars of the age of the vines, depth of soil, or character of the exposure, are given in either case. It is clear that such statements have no scientific value at all, and that the loss, in these cases, may have been due to other and older enemies of the vine.

I have inquired of several extensive vine-growers in the Alto Douro (the port wine district), and I can learn of no undoubted case of the appearance of *Phylloxera vastatrix*. One gentleman of great experience was inclined to think that the vine has for many years been subject to a disease, the symptoms of which correspond to the appearance said to be produced by the ravages of the insect. He had lately rooted up vines of his own, whose leaves were withered and yellow, but in no case were the roots in any way affected. He mentioned having seen, in the month of May of this year, a vineyard in which, in four days, the leaves had changed from a healthy green to the colour and appearance of the common zonal geranium, but here, unfortunately, no further examination was made.

The observation of the gentleman I have quoted is worthy of all attention, but the opinions of many of the wine-growers are fanciful beyond belief. One authority (quoted with approval by Senhor Oliveira, junior, and which may be cited here as a measure of the intelligence of others) is of opinion that the disease is in no case due to *Phylloxera vastatrix*, but the result of bad air, and all the proposed remedies he pronounces to be futile, except one—that of subterraneous fumigation of the roots with sulphurous acid gas; and this not because of any benefit to the plant, but because it would remove the prime cause of the disease—the foulness of the air!

The conclusions to which I have come, after fully investigating this subject, may be summed up as being—

1. That no certain grounds exist for believing that any, or, at least, any serious damage has been caused in North Portugal by *Phylloxera vastatrix;* but, while no scientific observation whatever has been brought to bear upon the subject, it is impossible to pronounce definitively upon its existence or non-existence.
2. That the great majority of vineyards in North Portugal will, from their peculiarities of cultivation, escape entirely.
3. That it would be safe to predict that, if ever the insect becomes numerous here, its destructive influence will be felt first and chiefly in the vineyards which produce the Bairrada wine, and afterwards, and less extensively, in the district of port wine production.

This report is entirely confined to the limits of my Consular district.

(Signed) OSWALD CRAWFURD.

Her Majesty's Consulate, Oporto, 29th June 1872.

No. 4.

Lord Lyons to Earl Granville.—(*Received* 17*th July.*)

My Lord, Paris, 16th July 1872.

With your despatch of the 25th ultimo, your Lordship was so good as to send me a copy of a despatch from Her Majesty's Minister at Lisbon on the subject of the *Phylloxera vastatrix*, an insect which preys upon vines.

I have the honor to transmit herewith to your Lordship copies of two despatches which I have received from Her Majesty's Consul at Bordeaux, to whom I applied for information respecting this insect.

I have, &c.,

(Signed) LYONS.

[Inclosure 1 in No. 4.]

Consul T. C. Hunt to Lord Lyons.

My Lord, Bordeaux, 2nd July 1872.

I have the honor to acknowledge the receipt of your Excellency's despatch of the 30th ultimo, inclosing the copy of a communication to Earl Granville by Her Majesty's Minister at Lisbon, on the subject of the insect *Phylloxera vastatrix*, which has attacked the vines of France and Portugal, and instructing me to make a report upon it.

This insect, which seems to have been first observed in the course of the year 1868 among the vineyards of the Rhone, is said to feed on the juices of the most tender roots, and, by cutting off the flow of sap at its fountains, to cause the death of the vine.

I am not aware that it has been found in this part of France, although reports of its existence here were not wanting as far back as 1870. There can be no doubt that, as the situation of the evil is of very difficult access to any topical application, the introduction here of an insect of such enormous multiplying functions would have been a constant subject of reference by the local newspapers.

Not, however, to trust to my own accidental means of knowledge, I have addressed a letter to the Prefect of this department, and to the President of the Chamber of Commerce of Bordeaux, begging them to furnish me with any information upon the question that they may possess ; and I will lose no time in forwarding their answers to your Excellency.

I return the copy of the Lisbon communication inclosed in your Excellency's despatch.

I have, &c.,

(Signed) THOMAS CAREW HUNT.

[Inclosure 2 in No. 4.]

Consul T. C. Hunt to Lord Lyons.

My Lord, Bordeaux, 15th July 1872.

With reference to my despatch of the 2nd instant on the subject of the insect *Phylloxera vastatrix*, which has attacked the vines of the east of France, I have the honor to transmit to your Excellency the inclosed copy of a letter received by me from the President of the Chamber of Commerce at this place, containing the information possessed by him respecting this new danger to vineyard owners.

The President, after showing that an insect of the kind was discovered at Floriac, near this town four or five years ago, but has only

been observed to a small extent on two or three other estates ; that the Government of Paris has offered a reward for the discovery of a cure ; that the cause of the malady is unknown, and that the destruction of the plants is recommended as necessary ; questions the identity of the cases observed here with the disease of Languedoc.

So far as I have been able to learn from private inquiry, the insect is almost unknown in the neighborhood of Bordeaux.

I have, &c.,

(Signed) THOMAS CAREW HUNT.

[Inclosure 3 in No. 4.]

* *M. Corti to Consul T. C. Hunt.*

Sir, Bordeaux, 11th July 1872.

I have obtained from persons of experience in *Phylloxera vastatrix* the following account, in reply to the questions on which you seek for information, viz. :—

1. Since the first appearance of the disease in the Palu de Floriac, now four or five years ago, its ravages have not spread to any notable extent. In only three or four vineyards has it killed a few vines in this commune.
2. The Government has entrusted to special commissions the study of the disease. It has offered the respectable reward of 20,000 francs (£800 sterling) to the inventor of an effective method of treating the disease, and has encouraged every investigation and experiment calculated to throw light on points in science and practice arising out of this new enemy of our vines.
3. No one knows what the causes are which have produced this malady, and no one has published anything that is satisfactory on the subject.
4. With reference to the means found to have been efficacious in warding off an attack of the evil, none have been yet discovered. The Agricultural Society of the Gironde has advised vignerons, as soon as the disease makes its appearance, to root up the dead or diseased vines, to dig the ground deep below the roots, to burn the vines in the holes, to pulverize the clods, and mix the soil with strong manure, and then plant fresh vines in the places. Some vineyard proprietors in the Palu de Floriac have acted on this advice, and at the present time the new vines are thriving well.

* Translated from the French.

Now, on the other side, I have received some information also from good sources.

From what would appear, no official measures have been taken to determine the nature of the disease. Once only, two years ago, the Prefecture desired the Professor of Agriculture to work it out, and report upon it.

Amongst us the causes of the disease would be very difficult to verify. Most particular attention should be paid to all the conditions of any locality in which it may happen to be dying out.

The means adopted to combat it offer nothing new, nothing local. The practice in this regard is the same as in the district of Gard, &c.—in all cases eradication of the infected vines.

Many other questions besides those answered above might have been put; *e.g.*,—Is the insect called *Phylloxera vastatrix* the cause, or only the consequence of the disease?

Again, do the cases which have occurred among us bear evidence of being the same malady as that which has been so general, so destructive, in Languedoc?

These points, the importance of which any one can see, are at present very far from having been cleared up.

Quite recently there has appeared a sort of résumé, with drawings of the insect, by M. Heuzé.

Such, Sir, is the information which it is in my power to transmit. I hope you will find it sufficient. At any time I shall be happy to render any assistance in my power.

I have, &c.,
(Signed) CORTI.

No. 5.

Lord Lyons to Earl Granville.—(*Received 24th July.*)

My Lord, Paris, 23rd July 1872.

With reference to my despatch of the 16th instant, I have the honor to transmit to your Lordship copies of a further despatch from Mr. Consul Hunt and its inclosures, relative to the insect *Phylloxera vastatrix*, destructive to vines.

I have, &c.,
(Signed) LYONS.

[Inclosure 1 in No. 5.]

Consul T. C. Hunt to Lord Lyons.

My Lord, Bordeaux, 22nd July 1872.

With reference to my despatch of the 15th instant, in which I transmitted to your Excellency a communication from the Chamber of

Commerce at this place, on the subject of the insect *Phylloxera vastatrix*, I have the honor to inclose the copy of a letter, with the papers accompanying it, received by me this morning from the Prefect of the Gironde.

These papers admit the existence of the insect in the neighborhood of Bordeaux, but show that it has not been propagated beyond the part where it first appeared.

As in the more eastern districts of France its ravages have been widely extended as soon as it appeared, there must be great doubt whether the insect found here is the same that has done so much mischief there, or whether it is the true cause of the mischief.

In support of this view I inclose an extract from a local paper of the 19th instant, the result of an examination of some vineyards in this neighborhood, where the insect was found, but in too small numbers to account for the effects attributed to it.

I have, &c.,

(Signed) THOMAS CAREW HUNT.

[Inclosure 2 in No. 5.]

* *M. Duval to Consul T. C. Hunt.*

Bordeaux, 19th July 1872.

Sir,

In reply to the wish expressed in your letter of the 2nd instant, I have the honor to communicate such information as I possess concerning the propagation of the *Phylloxera vastatrix* in my department.

From information supplied by the Agricultural Society in a report, a copy of which I inclose, you will see that up to the present time there have been only partial attacks of this disease, and which have been confined to the commune of Floriac, near Bordeaux, and some of the neighboring communes.

As far as concerns the causes of this disease, and the measures adopted by the Government to stamp out *Phylloxera vastatrix*, the information which I inclose herewith will be found to contain suggestions useful for consideration, and which will at the same time assist you in replying to the questions asked by the Ambassador of Her Britannic Majesty at Paris.

I have, &c.,

(Signed) FERDINAND DUVAL.

* Translated from the French.

[Inclosure 3 in No. 5.]

* *M. Dupont to M. Duval.*

SIR, Bordeaux, 9th July 1872.

In your letter of the 2nd July instant, you have asked from the President of the Agricultural Society some information on the subject of the new vine disease, the *Phylloxera vastatrix.*

The President is absent on business connected with the department of agriculture, which has been entrusted to him by the Honorable the Minister of Agriculture, and I think it is my duty to reply in his stead.

The disease of the vine known as *Phylloxera* has not spread to any great extent in the Gironde. The locality in which it has been observed for the last four or five years, limited to a few acres of vineyards situated in one or two communes close to Bordeaux, is by no means extensive.

Were we to credit mere rumour without proof, this devastating pest might be found more or less everywhere. Superficial observers appear strongly inclined to lay at its doors the destruction of all vines.

This is a very great mistake. For the last four years the vines have suffered severely from extreme climatic changes, chiefly from frosts. In many parts of the Gironde, causes arising out of the nature of the soil and the cultivation have been added to the severity of the weather. This coincidence has left our vineyards in anything but a flourishing condition.

The spread or progress of *Phylloxera* is a small matter. All careful observations place these exaggerations beyond a doubt. While on one hand the original source of the *Phylloxera,* close to Bordeaux, has not gained on the country, on the other hand, the replanting with new vines has been a complete success, in the land and in the very places where the former vines had died—the same vines on which the existence of *Phylloxera* has been demonstrated.

These two facts are of great weight. From them we may draw favorable conclusions for the future.

The question of *Phylloxera* has been placed even at this day by certain publicists on grounds purely scientific.

The Agricultural Society of the Gironde, on the contrary, studied it, and endeavoured to solve the problem from the purely practical point of view. Without expressing any decided opinion, it has never ceased since the appearance of the presence of the malady to tender to vignerons advice showing the overwhelming importance it attaches to

* Translated from the French.

the success of replanting, to the preparation of the soil by pulverization, and the employment of manures. Results obtained in certain vineyards where the disease had broken out warranted it in this course. It will not cease to afford further information, by publishing the most careful observations tending to throw light on the part played by this insect on the vine plant. In conclusion, Sir, I am happy to be able to assure you that the *Phylloxera* is stationary in the Gironde.

As far as concerns the disasters that have befallen some of our vineyards, I think they should be attributed for the most part to unusual atmospheric causes, and to others arising out of the geological formation, and the character of the cultivation.

I have, &c.,

(Signed) DUPONT,

Secretary-General of the Agricultural Society.

[Inclosure 4 in No. 5.]

* *Report addressed to the French Minister of Agriculture and Commerce by the Commission appointed to inquire into the new disease which is afflicting the Vine.*

Several large vineyards in the south of France have been invaded during the last few years by a formidable and entirely new disease. The vines attacked by it succumb as a rule at the end of the second year.

This disease, the origin of which is unknown, appeared for the first time in the valley of the Rhone during 1864 or 1865, but it was not until 1867 that it attained sufficient proportions to excite alarm. In 1868 and 1869, however, it had become a regular scourge. Then it was that those wholesale desolations of extensive vineyard properties were seen which struck terror amongst the vignerons, and appeared to be so much the more dreadful because the first indications of the evil had perhaps been overlooked. From that time the disease did not cease to spread, and it now extends from the department of la Drôme to the confines of la Crau, more particularly on poor, dry, gravelly soils, and naturally wet lands. The district of Orange, one of the most severely visited localities on the left bank of the Rhone, had already lost during last year 3600 hectares (8895 acres) of vines out of the 10,880 (26,884 acres) which it formerly possessed. The department of Basse Alpes, hitherto unattacked, is beginning to be infected.

On the right bank of the Rhone the progress of the disease has not been so rapid. The department of Gard has, however, been attacked in

* Translated from the French.

a great many quarters. The Ardèche has diseased vines, and l'Hérault already shows the early symptoms of the malady. The progress of the disease in the Bordeaux district, where it appeared some years ago, has been slower than in the valley of the Rhone.

The most characteristic external feature of the new disease, and that which has been mostly noticed by all observers, is the existence, in all recently affected spots, of a centre of attack which extends itself without intermission. The vines contiguous to the first seat of infection shed their leaves, and grow yellower and yellower until they become completely dried up. When the vineyard attacked is a large one and the disease sufficiently active, instead of one centre of infection there are several. From these facts it has been generally inferred that the disease is propagated in two ways—progressively and intermittently. The gradual extension of the various centres of attack, of which we have just spoken, reveals the first mode of propagation; their existence simultaneously at several isolated points is proof of the second. Experience has also taught us that the new vine disease progresses by irregular bounds, often appearing suddenly at great distances from the already ascertained centres of infection. When the roots of the infected vines are examined it is easy to perceive that they have undergone considerable change; they are always soft and rotten, and their tissues, hypertrophied and void of firmness, yield to the pressure of the fingers.

These serious disorders are due to a species of aphis, which has been named *Phylloxera vastatrix*. This insect, which is almost invisible the naked eye, establishes itself upon the roots of the vine, and perforates them with its proboscis in order to feed upon their juices. These repeated perforations probably irritate the tissues and induce hypertrophy. They give rise to knots upon the fibres of the roots, which are quite peculiar to the new disease, and form a fundamental distinction between it and all other kinds of affections observed in the vine, such as the "pourridie" or "blanquet," a sort of rot produced by subterranean fungi, and the disease "camargue" which has already caused the destruction of a large number of vine plantations. It must at the same time be remarked that the *Phylloxera* never remain upon the roots which are beginning to decompose. When one part grows putrid they immediately remove to another. In fact, they cause putrefaction, alway going before it, and never following after.

Hitherto none of our own varieties of vine has escaped this new disease, but it is reported that there are some American varieties in the outskirts of Bordeaux, which, although they have been surrounded by infected plants for three years, show as yet no signs of suffering from the new disorder. The insect which thus riots on the vines belongs to the genus

Phylloxera, and constitutes part of the order of *Hemiptera,* and more particularly of the sub-order *Homoptera,* the most commonly known of which are the grasshoppers, the lice, and the cochineal. It forms of itself a small family, which is a sort of connecting link between the lice or aphides and the cochineal or coccideæ.

According to the recently made investigations, the *Phylloxera* exists under two different forms—the wingless and the winged ; it is not viviparous, but during the whole season and under both forms it only lays eggs. We must add that the individuals hitherto observed, and they have not been few, have always been females. The male *Phylloxera* had not been found either in the winged or apteral state, although long diligently sought after.

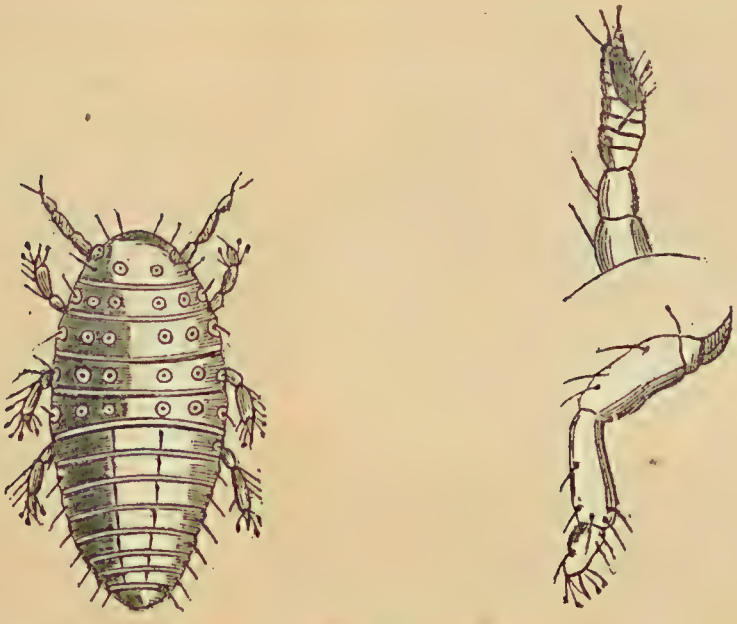
The principal changes which these insects undergo are as follow :— They pass the winter on the roots of the vine in the wingless state, and never in the egg condition. So long as the weather is severe they remain in a state of perfect torpor ; but as soon as the warmth begins to make itself felt, all those individuals which have survived the cold and the damp of the winter begin to waken to renewed life. They feed with great avidity, and immediately begin to lay eggs. The increase of them soon becomes terrific, and stops only in October. It is during this time, which extends over seven or eight months in the south of France, that the *Phylloxera* works the greatest havoc.

The *Phylloxera* is essentially subterranean in its wingless state, and in all probability makes its way along the roots of the vine, following the numerous fissures which it finds upon their surface. But it does not always remain in this state.

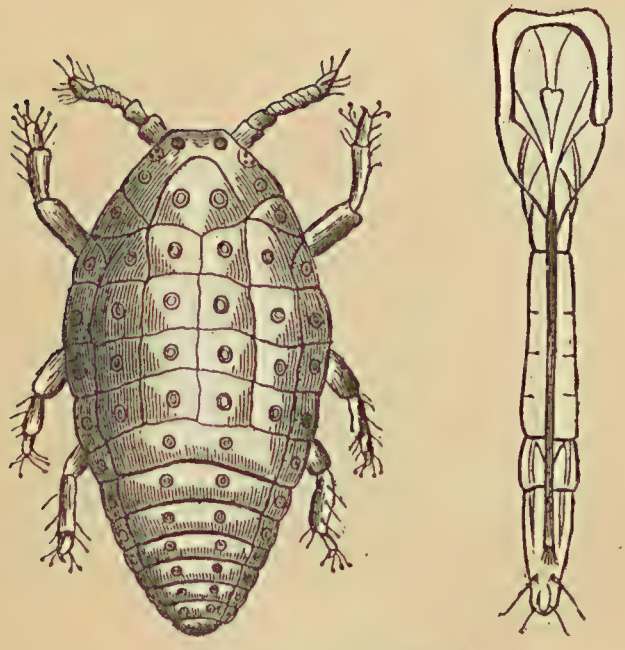
During the warm season a few individual insects can here and there be seen with small appendages upon their corselet, which are destined to become wings. These are the real nympha, which soon throw off their covering, and appear as perfect insects provided with wings, and having the eyes characteristic of their species. It is in all likelihood after it has taken this form that the *Phylloxera* is borne up and carried away by the wind to often very great distances, though it cannot be affirmed that even the wingless ones, in certain conditions, are incapable of being thus distributed.

We have said the winged *Phylloxera* is very rare. The number of these which have hitherto been observed bear no proportion to the myriads of wingless insects that can be seen on every part of the affected roots. Can this be natural ? or is it a difference owing to the errors of observation made in ascertaining the fact which we now state ? All the winged *Phylloxeras* which have been seen were females, who lay eggs and thus give birth to the wingless lice.

PLATE VIII.



Phylloxera vastatrix—Wingless form.



Phylloxera vastatrix—Wingless form.

PLATE IX.

Phylloxera vastatrix.

Phylloxera vastatrix—Galls.

There is a fact of very great importance connected with the existence of the insect in the winged state. In the valley of the Rhine, and still more so in the vicinity of Bordeaux, some vines—it is true only few in number—were noticed during the summer, the leaves of which were covered with galls of a peculiar form, the warty protuberance being on the under and the opening upon the upper side of the leaf. This fixed character establishes a radical difference between the galls in question and all the other kinds of galls or excrescences which are found upon the leaves of the vine. These galls are nests filled with wingless lice, resembling very closely those which are found upon the roots. It is thought that the formation of those galls and the insects they contain is due to the agency of the winged *Phylloxera*.

As we have seen, the *Phylloxera* has two different phases of life. It nearly always remains below the earth, though now and then a few individuals are liberated to the enjoyment of an existence in the open air. The subterranean life of the insect is well known, but not so that of the other form. It would, however, be very interesting and very useful if we could only ascertain precisely at what time of the year the transformation of the winged insect takes place, how long it remains alive, and upon what part of the vine or of the soil it has its abode. The various ways of propagation in the *Phylloxera*, its origin, and the conditions most favourable for its development, should also be better known than they are. We might express a similar opinion with regard to the existence of the males and the period of fecundation.

Let us hope that systematically and diligently prosecuted biological studies will soon enlighten us upon these strange and momentous questions. It will perhaps be possible to destroy this insect, which is so very troublesome to get at during the time it lives underground, if we could only obtain a favourable chance of catching it on its excursions in the open air.

Such are the conditions, then, under which the new vine disease manifests itself; and although from the time of its discovery a host of remedies have been suggested for it, as yet not one of them has proved thoroughly efficacious. Will some more active remedy be found? Shall we—and it is not improbable—derive more benefit from those already tried? We dare hope so. It is, however, very certain that the effectiveness of the remedy will not merely depend upon the nature and efficacy of the substance employed; but the mode of application and the time at which it is used will also always be of very great importance. The substances capable of destroying these insects are very numerous; but, in order to produce beneficial results, care must be taken that they are not injurious to the plant, and that they can penetrate into the soil easily, to

a depth of from sixteen to nineteen inches, so as to reach the insects beneath. And here comes the real difficulty. Applications capable of destroying the insect without hurting the vine are what those persons who are seeking a remedy for the disease must endeavour especially to discover. Whilst awaiting that time when science shall have devised some means of averting this evil, the Commission counsels vignerons and municipal bodies to follow the example given in l'Hérault and la Gironde, where the diseased vines have been rooted up and the soil disinfected by the clearing off and burning of the surface. The Commission also recommends the collecting together and burning of all gall-bearing leaves.

These remedial measures, which are analogous to those used in the case of the cattle plague, have the advantage of destroying a great number of insects, which would otherwise increase and communicate the disease to the surrounding vines. Applied in time, and systematically conducted under intelligent supervision, they may impede the progress of evil and even repel it.

In instituting a prize of 20,000 francs (£800) for the discovery of a remedy for curing the diseased vines, the Minister of Agriculture and Commerce has shown a deep anxiety for the interests of viticulture. His appeal to men of science will be heard, and it is to be hoped that we will soon be in possession of a complete history of the disease, and of an efficacious remedy that will restore confidence to our vignerons.

The rooting out of the diseased vines and their employment with other combustibles for burning the infected soil, the collecting and consumption of the leaves bearing the galls, will restrict the onward march of the evil and hasten the time of its arrest. Those persons who devote themselves to research in this direction should give themselves sufficient time for attaining their object, for it must not be forgotten that, in the solution of complex agricultural problems, it is not possible to improvise ; and, more than that, it is allowed to no one to guess at nature.

(Signed) MM. DUMAS, Secretary of the Academy of Science, President,
DUCHARTRE, MARES,
MILNE-EDWARDS, PAUL GERVAIS,
DE LA VERGNE. LEFEBVRE DE SAINTE-MARIE,
VIALLA, PORLIER. Secretary.

This report was not published last year owing to the disturbances in France. The Administration does not intend now to alter it, but it must be observed that since 1870 the propagation of the evil has continued, and both in the departments of Gard and l'Hérault it is no longer symptoms only that are to be seen. The existence of the male *Phylloxera* has also been proved, at least in the winged state, as it is mentioned in a report addressed by M. Heuzé to the Minister in July last.

*Conditions to be observed by Persons competing for the Government Prize for the New Vine Disease.**

Article 1. Every person wishing to compete for the prize of 20,000 francs offered by the Government to the discoverer of a process sufficient to destroy the new disease of the vine, should in the first instance notify his intention to the Minister of Agriculture.

Art. 2. No one will be permitted to compete unless he can furnish along with his application certificates to the effect that his plan has already been submitted to the test of practical experience, and can establish the presumption, on the basis of facts, that it would be found efficacious and economical in its application to the generality of lands.

Art. 3. The notification of intention to compete for the prize shall be communicated to the central commission. After the essays sent in have been examined, and even if possible a preliminary inquiry, the competitor shall give his advice as to all that is necessary for submitting his process to certain experiments which shall be carried out, and the effects of which shall be attested by the local commissions.

Art. 4. There shall be held a *vivâ voce* inquiry into the success or failure of each experiment. When this *vivâ voce* evidence has been put in order, under the supervision of the local commissions, it shall be forwarded by the Prefect to the Minister of Agriculture and Commerce, who will lay it before the central commission.

Art. 5. This commission will examine the *vivâ voce* evidence submitted for its approval, and that commission will award the prize, if deserved.

Art. 6. The memoranda, essays, and notices must be lodged either with the Minister of Agriculture (Direction de l'Agriculture) or at one of the prefectures of the Republic, at the very latest by the 31st December 1872.

[Inclosure 5 in No. 5.]

Extract from the "Gironde" of 19th July 1872.*

Since 1865, at which period its first destructive effects were experienced; since 1868, when the first systematic study of *Phylloxera* was originated, the disease has made a little advance every year; but its march has been slow—one might even say very slow, when we remember the rapidity with which it has been propagated in the south.

The communes of Floriac and Pompignac are the only ones seriously attacked. Floriac shows at the outside—taking both those on the flats

* Translated from the French.

and those on the hills—100 acres attacked and destroyed. Pompignac offers about 4 à 5 hectares (8 or 10 acres) of diseased vines. Here it broke out only in 1868. It is worthy of remark that these two centres of the disease are at from 7 to 8 kilometres distant one from the other, and surrounded by vineyards, uplands, hills, and lowlands, the general vegetation of which is very beautiful.

The able correspondent who has furnished these details adds:—"I went on Monday morning to visit those diseased vines in company with several members of the Agricultural Society of the Gironde, and at Pompignac and Floriac our observations are but little different from those made at our last visit, and last year. The vineyards visited showed the disease to have broken out in several different places, and in these we found some hundreds of diseased plants. There was no *Phylloxera* on the roots of either the dying or the dead vines. On the roots of vines still possessing a certain amount of healthy growth we found the *Phylloxera* in groups, neither numerous nor near together: indeed the roots, even the long ones, upon which we were able to count one hundred individual insects were very rare. The general vegetation is normal, and vines quite close to diseased ones had no *Phylloxera* on their roots. In this state of things many members of the Agricultural Society naturally asked, 'Can it be that the destruction of a plant so robust and hardy as is the vine should be attributable to no other cause than the action of a microscopic hemiptera called *Phylloxera vastatrix*, and which is found here in numbers comparatively insignificant?'"

No. 6.

Dr. Hooker to Viscount Enfield.—(*Received 20th September.*)

Royal Gardens, Kew, 19th September 1872.

My Lord,

Having examined the papers relating to the injury which the cultivation of the vine has already suffered in France and Portugal, or which is apprehended, from the attacks of the *Phylloxera vastatrix*, I have to request that you will lay before the Right Honorable the Secretary of State for Foreign Affairs the following remarks which have suggested themselves to me in their perusal.

Your Lordship will have gathered from these papers that the *Phylloxera* attacks the vine in a part—namely, the root—in which it is not only very sensitive to injury, but to which the application of any topical remedial agent is exceedingly difficult.

Considering the undoubted injury which the culture of the vine has already received from the *Phylloxera*, and our present ignorance of any effective means of arresting it, it is impossible to view without alarm its gradual extension in vine-growing districts. The extreme anxiety which is felt upon the matter in France is evidenced by the extensive literature which has already been devoted to it. A summary of this up to the end of last year, and dealing with no less than 500 separate papers and articles, has been recently published by MM. Planchon and Lichtenstein, under the form of an extract from the proceedings of the thirty-fifth session of the "Congrès Scientifique de France," held at Montpellier.

It appears from this that no remedy really effective has at present been devised, except that of flooding the vineyards during winter, by which means the insect is destroyed in its hybernating condition. Unfortunately, though this is practicable in the lower part of the Rhone valley, it is obviously not possible in others, and these the most important of the French wine-growing districts.

The attention of the Portuguese Government seems to have been thoroughly roused to the importance of the subject. A communication from the French Consul at Lisbon, published in the *Comptes Rendus*, for 9th September of this year, "signale la présence du *Phylloxera* dans quelques vignobles non loin de Porto, dans le district de Villa Real, près des provinces de Douro et de Traz-os-Montes, ainsi que dans le voisinage de Santarem, à 70 kilom. de Lisbonne."

It is also stated that a Commission has been appointed by the Government to study the subject.

Mr. Consul Crawfurd in his report, dated 29th June (No. 56), was probably correct in his opinion as to the exaggeration of the statements current at that time. No harm can, however, arise from the vine cultivators being thoroughly warned beforehand as to the serious nature of the malady. There is reason to believe that, on the first symptoms of attack in isolated cases, the prompt destruction of the vine, its burning on the spot, and the subsequent treatment of the soil with some approved insecticide, such as carbolic acid, would be of great importance.

A communication from M. Louis Faucon, who has practised the method of submersion with success, was recently laid before the French Academy (*Comptes Rendus*, 9th September 1872), in which the important fact, ascertained apparently with certainty, is announced that the *Phylloxera*, in migrating from diseased to healthy vines, comes to the surface of the ground during sunshine. Its dispersion is also, no

doubt, in this case favoured by the action of the wind, by which it is blown along the surface with dust.

With respect to Mr. Consul Crawfurd's opinion that the deep-rooted vines of the port wine district will enjoy an immunity from the disease, it is proper to remark that even deep-rooted plants have superficial roots as well, and, as the vine is notoriously sensitive in cultivation to influences injuriously affecting its root action, there is reason to fear that, if the superficial roots of a vine were materially affected by the *Phylloxera*, the health of the plant would not be altogether unaffected.

With reference to the despatches and inclosures (Nos. 405 and 416) relating to the Bordeaux district, it appears that the presence of the *Phylloxera* has been definitely ascertained there by the Commission appointed to study the subject by the French Academy (see *Comptes Rendus* for 9th September, above cited). Its ravages are, however, more slow in their extension than in the southern portion of the Rhone valley, and have taken a somewhat different form. A remarkable fact is the immunity which vines of American species appear to enjoy in this district.

Nor have the vines cultivated in this country under glass escaped up to the present time. There are now several well-authenticated cases of injury from the *Phylloxera*, and there is even reason to believe that it is present in many places where it has not as yet been recognised.

I have, &c.,

(Signed) JOS. D. HOOKER, Director.

No. 7.

Consul-General Monson to Earl Granville.—(*Received 11th November.*)

Pesth, 30th October 1872.

My Lord,

I asked M. Szlavy, the Hungarian Minister of Commerce and Agriculture, to-day, whether the *Phylloxera vastatrix* (referred to in Lord Enfield's despatch of the 25th June last), which had been so injurious to the vintages of France and Portugal, had been equally prejudicial to that of Hungary this year. His Excellency said that the Hungarian vintage was this year a very bad one, and, indeed, that the whole agricultural experience of the country, this summer and autumn, had been unusually depressing. With reference particularly to wines, M. Szlavy said that he hoped that the Exhibition at Vienna would be

the means of giving an impetus to the exportation to England of those of Hungary, which he imagined would be found most attractive to the English palate. In that hope he had caused a Hungarian tavern ("vendégto") to be erected in the precincts of the Exhibition, at which not only the best specimens of native wines would be laid in for consumption, but such national Hungarian dishes as most provoked and stimulated thirst would also be provided; and His Excellency thought that this arrangement would prove particularly attractive to the English.

Speaking afterwards, on the subject of the vine disease, with the Director of the Agricultural Department, I was informed by that gentleman that as yet he had heard of no effectual remedy against the ravages of the *Phylloxera vastatrix*.

I have, &c.,

(Signed) EDMUND MONSON.

APPENDIX M.

ON WINES.

BY THE REV. J. I. BLEASDALE, D.D., F.G.S., ETC.

In common with thousands of my fellow-colonists in Victoria, actuated by either motives of self-interest or pure patriotism, I have felt that the present Government has taken another great step in advance by creating a Department of Agriculture under a Minister of the Crown. The importance of such a department in any, but especially in a new country like Victoria, is beyond calculation if efficiently, not to say *zealously*, carried out. Societies of one kind or another, general or sectional, but all bearing directly on our agriculture, have sprung up in many places in this country as might be supposed, where interests more or less common to the residents in a given locality rendered interchange of ideas and experience a matter of general concern. But hitherto even the greatest and most comprehensive of these societies have left but little behind them in the shape of reports for general information.

The late Board of Agriculture did publish an annual report, but for such a colony as Victoria it was a meagre affair, and sinks into insignificance when compared with like documents issued in England

and America. Yet there was abundance of matter brought together at the Board's exhibitions and local agricultural shows, and nothing was wanting but detailed criticisms by competent judges and the collecting of them in a form that would be both permanent and easy of reference, whilst it would be a record from year to year of the growth or decay of any individual industry. The public in future will not have to complain of neglect in this matter, let us hope.

I feel almost ashamed of referring again to my trumpery doings in matters concerning local industries. Yet I do not regret the time I have devoted to one or two. I had much pleasure in forwarding, as well as I could at least, one—the wine industry.

As I walked up Elizabeth street in February, I think, 1851, I, naturally enough after a voyage of 100 days, bought a bunch of grapes, and then at once found myself again in a country that ought to grow good wine.

Not many days afterwards, as I was passing down Elizabeth street, before noon, I witnessed for the first but by no means the only time a dozen or so of bushmen, at the Bush Inn, near the corner of Great Bourke street, more or less drunk, who importuned me to have a drink, and one of them, having dipped a pannikin into a bucket lying on the footpath near the bar door, offered me the contents, say half a pint of rum and water, by the smell about half-and-half. From that time I turned my attention and all the knowledge I possessed then to forwarding wine growing and drinking as the one efficient cure for spirit-drinking and drunkenness.

When asked to contribute to the first volume issued by the new Department of Agriculture, I felt I could do no better service to the wine industry than reproduce, with such additions and corrections as I could make, the substance of investigations carried on as opportunity offered during many years, and thus render my records, never hitherto extensively circulated even in Victoria, permanent. And, as a line, in my opinion, ought now to be drawn at the commencement of the work of the Department of Agriculture, and all kinds of past work bearing on that branch of our national resources epitomized so as to create a record of the past and a fair starting point for the future, I thought it worth while to put in, as one of such records, what I know about the wine interest.

It will, therefore, not be out of place to incorporate in this essay, in a general way, portions of public documents framed in 1867, stating the condition of this industry at the close of the Intercolonial Exhibition, 1866–7. The following paragraphs embody the observations of the Wine

Judges upon the several distinct wine districts of Victoria, which were adopted and ordered to be printed along with the list of awards, and have not been challenged as to their correctness. As their Reporter, I said—

"Among the results of the many important new industries established in Australia, and displayed at the Intercolonial Exhibition, wine took a prominent position; and as it has now become one of the most hopeful sources of our future national prosperity, your Reporter conceives that any introduction to the report of the Wine Jury would be incomplete if it did not attempt to connect the culture of the vine in Victoria with the principal sources from which the plants had been originally obtained. In a once esteemed and still useful little work by Mr. Busby, an interesting account may be found of his journeyings in the wine districts of Europe, and of the collection of cuttings which he made, and was largely availed of in the first instance by the Messrs. McArthur, of Camden, in New South Wales, in 1831. The produce of that collection has formed the principal source of supply both to Victoria and South Australia.

"Another portion of our plants, at a later period, was obtained direct from Spain, Portugal, and France by vineyard proprietors in South Australia, and from them, in several instances, vineyards have been planted in Victoria.

"It has been stated that some of the vineyards on the Barrabool Hills, near Geelong, were planted with cuttings brought direct from Germany and Switzerland by immigrants from those countries; but how far this is correct, and to what extent the produce of such vines has spread, it would be difficult now to determine. The multiplicity of names given in different countries, and often in the same country, to a particular kind of vine, renders it often difficult to trace it back to its introducers.

"Certain it is that early in 1851, besides the vineyard at Pollocksford, Messrs. Belperroud, Brequet, and Pettavel had a considerable breadth of land under vines; and at Mr. Belperroud's a very drinkable white wine was made, and readily sold at about 30s. per dozen.

"With the upheaval of colonial society in 1852, consequent on the discoveries of gold and the influx of population, the infant colonial wine interest was nearly destroyed. The enormous price obtainable for fruit of all kinds, and the comparative cheapness and abundance of imported wine, as compared with the demand for it, rendered it folly to think of converting grapes into wine in Victoria.

"For several years little progress was made in forming vineyards. In 1858 and 1859 a move was again made in this direction, but the encouragement to persevere was but slender, and the taste for pure native wine could not be said to exist. Beers, ardent spirits, and hot wines held their empire over the people absolutely. An attempt was made about this time by the late Mr. Ralph Hutchinson, then Sydney agent for the wines of Camden, an excellent practical wine treater, to sell a few small parcels of colonial wines in wood in Melbourne, and to form the nucleus of a trade, but he could hardly get them off his hands, even at a sacrifice. He still, however, kept his eye upon the Melbourne market, and in the autumn of 1859 placed samples of all his best colonial stock in the hands of your Reporter for chemical analysis and other examinations, with a view to their being referred to standards of French, German, and Spanish wines, which he also supplied.

"When this work was nearly completed, and a good portion of the report drawn up, there appeared in this city Mr. J. Elliot Blake, whose errand was to try to dispose of a quantity of wine, chiefly from the Hunter River district. He opened a small

office in Collins street, and there, not without some trouble at first, introduced his wine to public notice. From this importation of Mr. Blake's the Victorian taste for colonial wine really dates. Then for the first time it became a matter on which men of respectability and refinement were not ashamed to express a favorable opinion.

"No sooner, however, was a demand beginning to be made for this colonial produce, than most of the smaller establishments which dealt in it were flooded with an article that required hardihood to taste; much bad imported wine, mixed with a little poor colonial, and rebottled, was sold for native Victorian wine. It was for the most part of a character to deter and disgust; and this was the state of the colonial wine trade, in Melbourne especially, during 1861–2–3.

"After that time pure wines of genuine merit made their appearance much more commonly, a better class of merchants and dealers took them in hand, and the demand for them has progressed most favorably, as was to be expected. Yet even now, to the discredit of this city, it must be said that in nearly all our best hotels a bottle of really fine Victorian, not to say South Australian, wine cannot be had; not that they do not keep a little, but it is not made a feature in their business; and the way in which the caterers for the Exhibition treated it was enough to show how little they considered it to be in demand by their customers. Yet in spite of this apparent apathy on the part of those who might be justly looked to as the leaders in an industry of this nature, the human instinct goes on displaying itself, and the demand is increasing at an enormous ratio. All honor to those who had the bravery to open their wine stores, and sell a good sound article at a moderate price. It is more than can be said of Sydney, that a man can obtain in Melbourne a single bottle of good wine for one shilling, or have it delivered at his residence for twelve shillings the dozen bottles; and that he can buy it in the wood at four shillings per imperial gallon. In this we equal the price at which wine is vended in South Australia. At the Adelaide Club, the principal institution of the kind in that city, wines of a very superior quality are placed on the table at one shilling per pint bottle.

"Your Reporter has endeavored to include a brief account of the districts (so far as he is personally acquainted with them) from which the exhibits were obtained, and thus, while remarking on the samples shown, and endeavoring to do them justice, make this an opportunity for placing on record some account of the present condition and prospects of Victoria as a wine-yielding country. There is some reason to hope that a future but not distant day, when every hill-side and shaded nook will show its vineyard, and when wine will be as common as milk, the historian of this portion of our native industries will con the pages of these reports not without a feeling of curiosity and interest, and will be even thankful for the progress-mark which the Intercolonial Exhibition has erected.

"Perhaps this will be the proper place to observe that the wine was and ever must be at a great disadvantage in an exhibition. To bring it home, like most other kinds of exhibits, to the appreciative senses of the public, something more is required than to show the outside of a sealed and labelled bottle, no matter how tastefully and elaborately it may have been got up. In fact a very large proportion of the exhibits placed in the great hall consisted of bottles filled with some colored fluid and not wine at all. Wine would, in many cases, have been utterly destroyed. In the wine cellar the visitor might form an idea of the number and variety of kinds of wine, but still only from viewing the outside of the bottles.

"Through the special favor of some exhibitors, as Mr. E. J. Peake, Mr. J. Gilbert, Mr. Auld, and one or two others in South Australia; and Mr. Umphelby, Mr. E. J.

Panton, Messrs. White Brothers, and a few of the Victorian growers; and also through the kindness of the Agent-General for New South Wales, Mr. Dyer—your Reporter was enabled to open bottles, and allow such gentlemen as he considered capable of judging of wine, or who wished to select a wine with a view to buying for their own consumption or for trade, to sample it for themselves; and in this way to some small extent the wine was actually exhibited. It is to be regretted that for the rest the public must rely on the judgment of the jurors.

"The following tabulated statement has been courteously supplied by the Honorable the Commissioner of Trade and Customs, and will, it is believed, be replete with interest for the intelligent reader, as showing the quantity of wine entered at the Custom House during 1866, the various countries from which it was shipped, and the total amount Victoria spent that year on wines.

"'VICTORIA.—1866.

"'RETURN SHOWING THE QUANTITY AND VALUE OF WINE IMPORTED DURING THE YEAR 1866, ARRANGED UNDER THE SEVERAL PLACES OF SHIPMENT.

Place of Shipment.	Quantity.	Value.
United Kingdom ..	183 pipes, 67 butts, 20 puns., 1437 hhds., 50 half-hhds., 104 brls., 108 casks, 13,380 qr.-casks, 511 octaves, 17,965 cases, 21,301 galls.	£203,156
New South Wales ..	77 hhds., 4 casks, 242 qr.-casks, 46 octaves, 139 cases, 1733 galls.	6,662
New Zealand ..	13 qr.-casks, 281 galls.	351
South Australia ..	105 hhds., 18 qr.-casks, 6 cases, 2882 galls.	2,262
Tasmania	1 hhd., 8 casks, 3 qr.-casks, 3 cases, 182 galls.	286
Western Australia ..	2 galls.	1
Foreign States.		
Bordeaux	98 hhds., 100 qr.-casks, 6144 cases, 486 galls.	10,213
Bourbon	1 gall.	1
Cadiz	8 galls.	4
Cape Town	24 galls.	23
Charente	1259 cases, 296 galls.	1,198
Hamburg	30 cases, 15 galls.	96
Mauritius	4 galls.	5
Oporto	50 hhds., 1242 qr.-casks, 185 cases, 20 galls.	14,282
Rotterdam	1213 cases, 52 galls.	1,834
San Francisco ..	73 galls.	28
Tomé	10 galls.	10
Total ..	183 pipes, 67 butts, 20 puns., 1768 hhds., 50 half-hhds., 104 brls., 120 casks, 14,998 qr.-casks, 557 octaves, 26,944 cases, and 27,373 galls.	£241,132

"'J. G. FRANCIS, Commissioner of Trade and Customs.

"'Custom House, Melbourne, 26th April 1867.'

"It would appear that only about £3000 worth of wine was imported from South Australia and New South Wales, and that the whole or the rest of the amount (£241,132) was for wine of foreign growth, whether arriving direct or coming through other colonial ports.

"In round numbers Victoria imported from South Australia 9000 gallons, valued at five shillings (5s) per gallon, and very nearly, if not quite, the whole may be presumed to have been of South Australian growth.

"From New South Wales Victoria received 13,300 gallons, at a declared value (average) of 10s. per gallon. Consequently very little of this could have been colonial produce.

"So that the whole of the colonial wine imported into Victoria from the Australian colonies, calculated at half a bottle per head, would about suffice for the population of Melbourne for *one day*.

"One may be pardoned for wishing to see in future a much larger proportion of our cash spent on the purchase of colonial wine, which, for its generous qualities, deserves our most favorable consideration.

"The evidences afforded by the samples shown in the Exhibition would be of themselves sufficient to convince any one acquainted with the instincts of habitual drinkers of genuine pure wines, that the districts south of the dividing range, beginning with Geelong and extending by Sunbury, Mount Macedon, Yering, and so on eastward, will yield the kinds most generally demanded for every-day consumption ; for in a very short time wine-drinkers come to prefer for their own use what they call 'a big drink,' 'a mouthful of wine with a nose on it,' 'a light, wholesome, refreshing tumbler-full, with no fear of its getting into their heads.' And, in fact, experience everywhere proves that in wine-yielding countries, where it is the universal beverage, morning, noon, and night, where the lighter sorts cannot be had cheap, water is *always* added as a matter of course.

"A great deal has been urged against vineyard properties on account of the high price of labor in the colonies ; the statement often has to be combated, 'How can we export wine grown in a colony where labor is three times the cost it is in the great wine-producing districts of Europe ?' Much may be said in reply. A system is now rapidly springing up amongst all the principal growers in Victoria, of letting the culture of their vineyards by contract, so much per acre per annum, to do every description of work that is required—the working of the land, the cultivation of the vine, assisting at the ingathering of the grapes, and making the wine in the cellar. The prices paid by the leading growers is not yet uniform. In the district of Geelong it is from £8 to £10 per acre ; in the Yering district, £9 to £10 ; in the Goulburn district large areas of vineyard are let by contract at £5 per acre ; in the Sunbury district the price is £4 10s. to £7 per acre. There can be little doubt the uniform price for cultivation will shortly be £5 per acre if horse labor is allowed, and £6 to £7 for hand cultivation in all the leading vineyards growing wine for general sale. No doubt even this price for cultivation only will rather astonish the agriculturist, when many crops of wheat standing in the ear are sold for less money : but under this system the proprietor knows what he has to pay, and at what point to commence to look for interest on his outlay. Six good vintages may be reckoned upon out of seven years. It may be stated generally that, with the increased yield of the vine in the Australian climate, and the comparatively cheap cost of the land, aided with a sound system of contract cultivation in the vineyard, the proprietors should not permit themselves to be worsted in the open markets of the world.

"The subjoined table, taken from the statistics just published, shows the total amount of wine for 1866 to have been 195,953 gallons. Taking the population of Victoria to be 633,000, this quantity would allow about five half-pints to each individual—a quantity hardly sufficient to supply the colony for *three days* if ours had become a wine-drinking population. There is an end then to all talk about this colony being in a position at present, or likely of becoming so for a few years, to supply anything approaching the wine required by the people, in proportion as their instincts draw them more and more to it.

"'VICTORIA.

"'THE ACREAGE UNDER VINES, AND THEIR PRODUCE IN EACH COUNTY AND UNSETTLED DISTRICT, AND IN THE ENTIRE COLONY, DURING THE YEAR ENDING 31ST MARCH 1867.

Counties and Unsettled Districts.	No. of Acres under Vines.	Vines.				Wine produced.	Brandy manufactured.
		No. of Vines.	Grapes Gathered.				
			Not made into Wine or Brandy.	Made into Wine or Brandy.	Total.		
Counties.	No.	No.	Cwt.	Cwt.	Cwt.	Galls.	Galls.
Anglesey	4	4,000	10	..	10	..	..
Bourke	704	1,008,970	2,299	3,097	5,396	17,546	..
Dalhousie	50	92,300	235	29	264	200	..
Dundas	7	13,162	99	198	297	360	..
Evelyn	365	929,348	110	5,231	5,341	33,004	..
Follett	..	..	..	..	..	..	..
Grant	1,004	2,241,881	1,972	7,409	9,381	50,728	21
Grenville	36	76,400	64	308	372	2,033	..
Hampden	..	..	..	..	..	..	..
Heytesbury	..	..	..	..	..	..	..
Mornington	56	115,840	62	245	307	975	..
Normanby	23	30,000	43	13	56	60	..
Polwarth	4	10,000	3	17	20	110	..
Ripon	50	90,000	234	184	418	181	..
Talbot	270	470,000	2,875	1,300	4,175	9,000	..
Villiers	42	67,000	92	130	222	432	..
Unsettled Districts.							
Gippsland	10	17,090	112	80	192	450	..
The Loddon	425	744,614	4,854	2,778	7,632	15,116	..
The Murray	848	1,374,080	296	14,534	14,830	62,935	..
Rodney	58	147,750	383	326	709	2,254	..
The Wimmera	95	236,691	760	139	899	569	..
Total, 1867 ..	4,051	7,669,126	14,503	36,018	50,521	195,953	21
Total, 1866 ..	4,078	8,199,618	18,063	31,686	49,749	176,959	795
Increase ..	..	..	..	4,332	772	18,994	..
Decrease ..	27	530,492	3,560	..	..	..	774

"'NOTE.—The acreage and number of vines are for the year ending 31st March 1867; the quantity of grapes gathered, and of wine and brandy made, are for the previous season. The grape crop comes in too late to admit of its being returned when the agricultural statistics are collected.

"'WILLIAM HENRY ARCHER, Registrar-General.'

"WINES OF THE GEELONG DISTRICT.

"Some of the vineyards of the Geelong district are reputed to be the oldest in Victoria—that occupied by Messrs. Galland and Junod, at Pollocksford, having perhaps the best claim to that designation. Those of Messrs. Belperroud, Brequet, Pettavel, and Dardel were in full bearing when first seen by your Reporter in 1851, and had, from the appearance of the cellars, already yielded a good wine.

"It is worthy of remark that this is one of the few districts in Victoria where lime and sandstone occur in large quantity, and, also, that it is exposed in an exceptional degree to the chilling south winds ; the whole back country lying towards the sea being comparatively low and densely timbered. In average years the grapes would be backward, and in less sheltered localities irregularly ripened. Then, again the method of wine-making pursued by many is that of Switzerland and the colder countries of Germany ; and the aim has been to produce wines of the hock and burgundy character. And certainly, if any district in this continent is calculated for such wines, it is that of Geelong, taken as a whole. And exactly in proportion to the age of the vines, the skill bestowed on cultivation, and the care and intelligence brought to bear on making and maturing these delicate wines, has been the success of the cultivators. Much poor wine has come from Geelong, and also some of the finest, if not the very finest, of our delicate samples.

"Among the best of the light agreeable kinds, such as we have begun to call summer wines, shown at the Exhibition, were the white wines of Dr. Hope, and the 1866 White Pineau and Reisling of Weber Brothers, and the red of Messrs. Galland and Junod. There was no question for one moment that each of these samples was of itself enough to entitle its maker to a medal for excellence of quality. The white wines being thin and delicate for the most part, demand care and skill in maturing them, and much caution about what substance, if any is to be used in fining them.

"WINES OF SUNBURY AND RIDDELL'S CREEK.

"(Distant from Melbourne from twenty-five to thirty-five miles.)

"Proceeding eastward from Geelong, the first and most rising district is that about Sunbury. These vineyards are all planted on a volcanic trap soil. The situation of the vineyards is considerably varied, some being on the eastern and northern slopes of a hill of moderate elevation, the others lying on the level, and those very near Sunbury on the edge of Jackson's Creek.

"The rapid strides in vineyard culture that have taken place in and around this district during the past four years are remarkable. One of the largest vineyards in Australia is here situated, and since its formation (the district having been found so admirably suited for the vine) vineyards are springing up in many directions. Upwards of 300 acres are already devoted to this culture within a radius of fifteen miles of this place. Situated well back from the seaboard, it is not exposed to those rapid changes of temperature that many vine-growers have to contend against ; consequently wines remarkable for sweetness were forwarded to the Exhibition from this district, and the collection being large and various, several honors fell to exhibitors from this place.

"The wines from the district of Riddell's Creek are worthy of note, being from a new and untried locality. Situated upwards of 1000 feet above the level of the sea these wines formed the subject of close criticism by the Wine Jurors. They were grown upon a rich basaltic soil, on the slopes of a well-sheltered valley, the varieties

being principally Pineau Blanc, Hermitage, Verdeilho, and Carbinet Sauvignon (the true Medoc claret grape), the latter being a most valuable wine grape, and but little cultivated in Victoria. Subsequent to the decision upon the latter wine by the jurors, the principal medical men in Melbourne met at the Exhibition building, for the purpose of sampling both the strong and the light wines. It was decided by them that the Carbinet Sauvignon, grown in the district of Riddell's Creek, was the best of the light wines suitable for hospital purposes ; the names of none of the growers being known until after the decisions were arrived at.

"The theory is now therefore completely upset that good wines cannot be made upon the south side of the dividing range. Your Reporter can affirm from his knowledge of locality and the additional experience gained by studying the collection sent into the Exhibition, that wines as various as those from the Medoc and Xeres are to be found within a radius of eighty miles around Melbourne ; or, by way of comparison with Australian wines, the variety to be met with within the distance stated may be classed as varying from the light wines of Geelong to the heavy wines of Adelaide.

"So far, then the growers, who appear to have invested much more capital on the south side than on the north side of the coast range, have only to study and plant the best variety of vines suited to their particular locality, and adopt the most skilful mode of manufacture, to ensure the production of good marketable wine. They may rest assured that the taste for the lighter wines is a growing one, converts the public first from ardent spirits and lower-classed beverages, and the palate, if not utterly vitiated, will very quickly seek out the purest and lightest wine that can be obtained.

"Whilst encouraging the growers south of the coast range, your Reporter must not be held as lightly to pass by the produce of those on the north side. To pay them the highest compliment in the fewest words, it may be said, 'Their wines are so good they will take care of themselves.' The Sandhurst and Castlemaine districts promise to produce wine second to none in Australia—wines in themselves possessing a high marketable value, not alone for the purposes of consumption, but for blending with weaker ones. In a commercial point of view, it is difficult to imagine that aught but success must attend well-managed vineyards in well-selected sites and soils in such a glorious climate.

"The energy and enterprise of the vignerons—Swiss, German, French, and English—is testing at all points this section of Australia Felix. The climate is being examined in every direction. The Exhibition brought to light wines the produce of districts never credited with the merit of making even the first attempt : wines from Gippsland, wines from Wagga Wagga, wines from near the summit of the coast range, wines from the Murray Plains, wines from Tasmania, wines from Western Australia. So rapid has been the progress and the determination to test new and untried localities, and so startling have been the results, that no one is safe from contradiction if he ventures to place his finger on the map and say wine cannot be grown in such and such districts, when it is remembered that good ripe grapes are now produced well towards the summit of Mount Macedon.

"It is much to be regretted that no exhibits of wine were sent in to the Exhibition from the beautiful vineyard of the Hon. J. G. Francis, at Sunbury, situated on the steep slopes rising from Jackson's Creek. One half of the vineyard consists of rich basaltic soil, terraced to suit the inequalites of the ground ; the remaining portion of the vineyard consists of a rich alluvial flat, the vines upon this being cultivated on wire trellises. It would have been extremely interesting to have received wines from

this vineyard, on account of the great care and costly mode of cultivation that has been adopted. The results arrived at on this vineyard would have borne the freshness of a new discovery. No doubt these wines were not sent forward on account of the age of the vineyard

"WINES OF THE MELBOURNE DISTRICT PROPER.

"*(That is, within a radius of twelve miles.)*

"There were several interesting samples in the Exhibition from about Brighton, Heidelberg, and Pentridge. They all belonged essentially to the character of wines of a coast exposed to rapid and frequent changes of temperature, and even extremes of heat and cold. But they all displayed, in a greater or less degree, the want of thorough knowledge of the treatment of such characters of wine. Among these exhibits were a few from about Hawthorn that had no doubt been good at some previous period, but which did not arrive at the standard of excellence set up by the judges. It is, therefore, not surprising that few distinctions, if any, fell to the exhibits of the metropolitan district. One or two writers in the papers have anonymously accused the jury of partiality in not taking a more favorable view of the wines of this district ; but there is no other reply to them than that the judges had no prejudices, and were nearly always quite unanimous ; and they were unanimous, after repeated examinations of these exhibits, that they were not what they ought to have been. There is no intention of disparaging the district for such wines as it ought to yield, but it must be put on record that the specimens that fell under the notice of the jurors were deficient in those good qualities that were necessary to entitle them to distinction : some had been badly made, others kept past their best. Great attention was paid by the jurors to this division, and great regret was expressed at the verdict they were compelled to return.

"It is much to be regretted that several growers and makers of wine about South Yarra and Hawthorn did not exhibit. As it is, the show from the city district was far below what it ought to have been.

"THE YERING DISTRICT.

"*(Distant from Melbourne about thirty miles east.)*

"This locality is sometimes called the beginning of our Australian Switzerland. It is, nevertheless, admirably situated for the production of wines of the character of those from about Geelong. For some reason not explained, the exhibits from this district were not numerous, and the quality was for the most part below what is generally known as the best Yering wines. No doubt as a district it will, ere long, be one of the favorites for producing those kinds of light agreeable wines which will eventually be the universal beverage, especially in our hot and dry summer weather.

"These wine districts are the only ones of considerable note at present on this side of the dividing range. With the increasing demand for wine as a general beverage, the culture of the vine will gradually spread, and many spots now not known will in time acquire a name and fame.

"The exhibits from Yeringberg Vineyard, which is situated in the parish of Gruyere, though not numerous, were of a high character, proving that much depends upon the selection of a good site, even in what might be supposed to be an unfavorable climate. Bordering on the Australian Alps, yet sheltered and protected by nature, Yeringberg Vineyard occupies one of the most favourable situations south of

the dividing range. A medal has been awarded to Messrs. Langdon and De Pury for their Verdeilho, &c.

"THE WINES OF DROMANA.

"These came before the judges with a certificate on the bottle that they were made 'from the pure juice of the grape,' &c.; 'no brandy,' &c.; 'exhilarating, but not intoxicating,' &c. They were no doubt the pure juice of the grape, but could not be praised for any distinctive merits. Again, here there appeared want of skill in the manipulation after the wine had been fermented.

"SECOND GRAND DIVISION OF VICTORIAN WINE DISTRICTS.

"WINES FROM COUNTRY NORTH OF THE DIVIDING RANGE.

"Journeying from the metropolis northward, the first vineyards on the other side of the dividing range are in the neighborhood of Castlemaine, and they are not at all extensive. The produce of the three vineyards with which we are best acquainted is that of Mr. Meredith, of Chewton; Mr. Hirschi, of Castlemaine; and Mr. Schroeder. Here we find what may be termed the transition districts, yielding wines of a character intermediate between those of Geelong and the Murray proper.

"All the exhibits from this district were young, but of great promise, and made for the most part on the systems in vogue in Germany, to which they seem capable of being adapted. The wonder is that a larger quantity of land has not been already brought under the vine in the neighborhood of these old diggings. There are hundreds of acres of these alluvial flats drained to perfection, and the upper surface needing little or nothing more than planting, which would yield fruit abundantly.

"SANDHURST DISTRICT.

"*(Distance from Sandhurst, from three to fifteen miles.)*

"At a distance of little more than twenty miles from Castlemaine stands the well-known mining town of Sandhurst, situate a little below the northern face of the hills forming the dividing range, thoroughly protected from the chilling blasts of the south wind, and having its natural sun-heat much increased by radiation from the broad treeless plains stretching to the banks of the Murray. This district is one of the largest and best adapted for the production of generous wine. It enjoys immunity from all danger of a fall of rain during the vintage, and consequently the fruit is ripened to perfection, and fermented at an even temperature. Perhaps, owing to such facts as these, Chasselas, a grape unfit for wine-making at home, produces a very pleasant palatable wine. In fact the climate of Sandhurst differs widely from any south of the dividing range in most of those characteristics which distinguish one climate from another. It is hot and dry, but not too dry for the vine. Here we at once come upon a class of wines, especially the red ones, wholly different from any south of the dividing range; and judged in relation to their strength, their depth of color, and spirituous properties, might probably defy comparison with any known unsophisticated wines. Their character, too, in spite of differences in manipulation, is quite distinctive; and there is no wonder at the high estimation in which they are

held by the judges when it is borne in mind that they had to judge of them in relation to their excellence *per se*.

"Seeing that the first experiments in wine-making on a large scale date back only to 1862, the vignerons have made remarkable progress, if we may judge from the number of excellent exhibits, most of them obtaining distinction. These samples were derived from vineyards situated at such distances from Sandhurst as to leave little doubt of the capabilities of at least four hundred square miles of country for yielding produce of the same high standing. Amongst vignerons who have taken the most prominent part in developing its resources hitherto may be mentioned—Messrs. Panton, of Huntly ; Bruhn, of Emu Creek ; Loridan, of Sheepwash (now A. Heine) ; Heine and Griffenhagen, of Axe Creek ; Vlaeminick Brothers, of Axe Creek ; Edwards, of Bullock Creek ; and Robinson, of the Campaspe. Judging from the published reports in local papers, no small credit is due to Mr. F. C. Klemm for the special services he has rendered in making the wine capabilities of the Bendigo district known. It is to his skilful treatment of them—in making some, and preparing much more for the market—that it first became known what the district could yield. There is no fear but that in future it will hold its own.

"WINE FROM ABOUT DUNOLLY.

"There was one sample or two of red wine, Scyras, from this district, grown on a limestone soil, that was of itself enough to show how admirably suited is the limited district in which it was produced for yielding wine of the richest and fullest body. The judges at once awarded it a medal, rather as a tribute to the district than the value of the actual produce yet obtained from it. They were, however, quite satisfied from reports furnished that it was a true specimen of the capabilities of the district for such splendid produce.

"WINES OF BENALLA AND WANGARATTA.

"These were for the most part of the character of the wines of the great valley of the Murray. Those from the immediate neighborhood of Benalla were, however, of a description somewhat intermediate between the produce of the south of the dividing range and those of Albury. Mr. Piper's agent exhibited several samples of Shiraz, Red Marangan (a very good wine made from the Black Hambro' and Grand Turk grapes), White Marangan, Chasselas, and some Muscats. The Muscats were of a superior quality, and to one of them was awarded a medal for excellence, one of the very few wines of that character deserving of special notice in the Exhibition.

"The wines from the district of Wangaratta were generally strong and full-bodied, but seemed to be the produce of young vineyards, and not to have had all the care bestowed upon them which their quality required. They were, however, an evidence of what that fine district is capable of yielding. It was to be regretted that a larger number of samples, and from places further assunder in the district, was not displayed.

"WINES OF THE VALLEY OF THE MURRAY PROPER AND FROM THE VICTORIAN SIDE OF ALBURY.

"The decomposed granite, trap, and drift gravel, uniting with every variety of situation and exposure, shelter from the extremes of heat and cold, especially from the hot winds, conspire to render this district the Australian equivalent of the far-famed Cima do Douro of Portugal. The one thing which seems to be difficient in the soil is *lime*.

"There is then no wonder that the vines should flourish in these districts, and that their produce should be rich in all those ingredients which go to form wines of the Port and Roussillon character."

Whether the present generation will witness the full development of the wine interest in all its leading branches or not, must rest mainly with itself; but that the industry will one day equal if not surpass, as a source of national wealth, any other needs not a prophet to foretell. Much yet remains to be done.

Suggestions offered to the Acclimatization and Zoological Society.

In another place I took the opportunity to point out to the Council of the Society that they have it now in their power to render champion service in forwarding the vineyard interest. Every facility for accomplishing a really great and beneficial work is at the present time at their very doors. The grounds of the Society are quite good enough for the work—where shelter will be needed it can be easily created—and to supplement the work in the Society's grounds, there is plenty of fenced and sheltered places at the Experimental Farm; so that there might be established at once, at a cost of a few pounds, the materials for the systematic study of our vines, the testing of newly-introduced kinds, and the introduction of such as are known to be proof against prevailing diseases.

This most important work has hitherto never been attempted in Australia, and, as it is to all intents and purposes one of acclimatization, I beg, therefore, to urge that it may be taken in hand by the Society, and I can give assurance that the country will thoroughly appreciate the boon.

Everything cannot be done in one year, but a good deal may be effected this season; cuttings of the Hermitage, Chasselas, Verdeilho, Burgundy, &c., could be got from each best vineyard in our various wine districts and planted, so as to keep the several kinds together. There is abundance of time to obtain specimens of the same varieties from South Australia and New South Wales. I venture to say that, for a purpose of this nature, the vineyard proprietors of those colonies would be but too glad to contribute to the success of an experiment, as important to them as to ourselves. Later on, many vines, found by experience in Europe and Asia to be proof against the present class of vine diseases, might be obtained and acclimatized in Victoria. The sooner the line of investigation found to be successful in the instance of apple blight is applied to the vine the better, as it appears founded in reason and easy of working.

There are, in vineyards in South Australia, many varieties of Spanish and some Hungarian vines that we have not yet introduced, and such as these might be provided for at Echuca.

There is another reason for establishing educational nurseries. There is to be, in all probability, an industrial school erected at the Experimental Farm, and, in that event, a collection such as I am advocating would form an integral part of the instruction of the lads. The method of treating vine-cuttings in the same way as cuttings and scions of apple trees is simple enough, and, when learned, would be of great value to them when apprenticed to vignerons.

No inconsiderable portion of the following essay was drawn up for the Official Record of the late Exhibition held in Melbourne by the Royal Commissioners for the London International Exhibition of 1873; much of what constituted my direct investigation was embodied in that essay on colonial wines. Still much more of importance to the wine interest of this colony might have been added, not without a hope of benefiting the producer, the trader, and the consumer, had time and the limited amount of money for the purpose of printing essays been, as it should have been, in closer conformity with the importance of the interest concerned.

At any rate, the money was not to be had, so that essays, in more than one instance, had to be either not written or done at odd times, with little or no clerical assistance, and when the time during which they must be got ready for the printer was necessarily limited.

Now I trust these two matters will be kept in mind by the reader. Moreover, I have made no attempt at "fine writing," but own to the plainest speaking and explaining.

Beneficial Action of the Acclimatization Society.

That the Acclimatization Society has already rendered most inestimable service by introducing into this new country many valuable kinds of foreign birds, beasts, and fishes, all having a direct bearing on the wants of human life, is beyond doubt. Might I now, without offence, direct the attention of the Council to one or two other matters of scarcely less importance than the above to human life and happiness, viz., to introduce the best South European habits of life; South European manners of living and dressing; of out-of-door recreation in the evenings, and proper public walks and gardens as places for such recreation. In their own already beautiful and interesting garden suitable accommodation for the people whom they wish to attract thither must be provided, where simple food, fruit, and a bottle of pure wine

could be had cheap, and they will set an example that will soon be followed elsewhere, to the advantage of public morals, the healthful enjoyment of all—but especially the artisan classes, at first—and the diminution of larrikinism. It will be something for the Society to be able to say that they were the first to make the grounds of the Royal Park the means of putting down juvenile ruffianism, by making them attractive for all kinds of suitable outdoors recreation after the day's work is over, and, under suitable regulations, supplying their reasonable wants at the lowest possible price; while, as in the countries of Southern Europe, their parents and sisters would amuse themselves for an hour under the strict regulations of their enclosed gardens.

Call the whole arrangement by the Spanish name, "Alameda," an institution everywhere in full force in Spanish towns and cities, and found to be indispensable to the health and comfort of the people.

In 1867, I concluded my first essay on Colonial Wine with the following remarks, which I think may be appropriately introduced in reference to the present subject:—"In the interest, then, of health and morality, and cheerful and happy homes, may I be pardoned for recording my heartfelt wish that I may live to see the time when even the humblest laborer, at the close of his hot day's toil, will stroll into our fine parks and public gardens, and there, with his happy family around him, enjoy his hour of relaxation, and drink his bottle of wholesome wine at the cost of a few pence, without either the reproach of extravagance or the danger of intoxication."

In the following pages will be found an account of such studies and analyses of colonial wines as I have been able to make during the last five or six years, which is now thrown out as a very small contribution to our common fund of information concerning this interesting and valuable new industry. I venture to call it, still, a "new industry," for the colony has hardly yet been prospected fully as to its whole capabilities for yielding wines; while the vines best suited to each locality are by no means clearly ascertained, and while the systems of making and maturing wine must for some time longer be experimental rather than fixed; as will be readily understood when it is remembered that, between the Barrabool Hills and the valley of the Murray, Victoria possesses every variety of climate, exposure, and soil that is to be met with between Neufchâtel and Lisbon.

And as the industry itself is, in my belief, but in an infantile state, though making fair progress, and as the products of vineyards of the same district are known to vary so markedly, I conclude that very much remains to be learned by those who are about to establish vineyards, and

by makers and treaters of wine as well as by the student of œnology. Of course I hold myself alone responsible for any opinions, statements, or deductions here laid down. I would premise, however, that the matter of this essay has been collected, and the remarks recorded from time to time, as opportunity offered, so of course I have made no attempt at literary composition.

Circumstances, to which I may have to refer hereafter, induced me, many years ago, to make the study of vines and wines an occupation for my leisure hours ; the results of which I have, now and then, laid before the public of the Australian colonies. I would refer briefly to some of these. As chairman and reporter of the wine experts of the Intercolonial Exhibition, 1866–7, I drew a somewhat lengthy account of the introduction of the vine into Australia, and the fortunes of colonial wine to the end of 1866. Subsequently I had opportunities of making more lengthy and detailed inquiries into several matters affecting the making, keeping, and maturing of our wines—to say nothing of efforts to remove prejudices against them. Though those investigations were by no means as thorough and complete as I could have wished, yet they appeared to me then, and do so still, useful in clearing the path of the vignerons.

The wine industry differs in multifarious ways from nearly all others, because the subject-matter of it is so various, and the methods of treating the same materials so different in different places ; hence there need be no wonder at the same product when pure presenting so many varieties.

Wine in relation to Climate, etc.

Climate, soil, aspect, any one or more of the hundreds of varieties of grapes entering into the formation of a wine—the duration of fermentation, the temperature of the cellar, racking, fining, &c.—all have to do with modifying the ultimate product—the wine. Then, again, the properties of nearly all the European vines change very much in Victoria. No one can doubt for a moment that the excellent judges, to whom were submitted recently some hundreds of samples of Australian wines in Germany and France (the remainder of the samples sent for competition at the last Wine Exhibition, held by the late Board of Agriculture) expressed their conscientious convictions of their merits or defects. But this is remarkable, especially as regarded the white kinds, that in several instances where they ventured to name the grape or grapes a wine was made from, they were wrong.

It must be borne in mind that wine is a very compound fluid ; among its principal constituents, such as are always present in it, are water,

spirit of wine, tannic acid, tartaric acid, phosphoric acid, racemic acid, malic acid, sugar, an oxide of iron, and potash, with generally a small quantity of lime. These are the principal, but by no means the only ingredients of pure wine. The bouquet, as it is called, is a true æther, and is formed by the action of the acids on the alcohol in a nascent state, and the flavouring principle of the grape, from which each distinctive bouquet is derived. The iron, potash, phosphoric acid, and the lime, are taken up from the earth; the elements of the other acids, sugar, alcohol, &c., from the air and water. A glass of genuine wine contains a varying quantity, generally about one-fifth or a little more of its bulk, of proof spirit, and four-fifths water, when not fortified.

Wine in relation to the Human System.

Wine, not *must*,* fortified to any considerable extent, say five per cent. or upwards, produces in its action on the human system an effect somewhere between that of pure wine and brandy, or some less pure spirit, diluted with water. Hence the *headiness* of *fortified* wines. The Portuguese, and probably the general Spanish practice of adding two or three per cent. of proof spirit to the fermenting musts, in order to arrest a too great production of spirit and waste of body, is *a totally different affair;* because the added spirit merely destroys the albumen and other nitrogenous matters, and along with them is itself deposited as an almost insoluble compound—the mark; thus leaving the wine with a material to feed upon—a little of the natural sugar of the grape—and less spirit than it would otherwise have formed for itself at the expense of the gummy and other quasi-saccharine matters contained in and thus precipitated from the must. Wines so made seldom become "*ropy*," and hardly ever take "*the flour*."

The proof spirit, however, in the case of wine, differs widely in its action on the human system from so much distilled spirit and water; for in wine it is not a mere mixture, but a combination, and it stands in chemical relations with the tannic and tartaric acids and iron. Tannic acid is a powerful astringent and tonic, while tartaric acid, combined with potash and iron, has its own peculiar action on the human economy. It is evident, then, that pure wine must be slowly digested before it can get into the general circulation; and it is also plain, that it more nearly resembles the nicely-adjusted prescription of a physician than aught else. And it is a prescription prepared by the greatest of all physicians, not alone as a restorative or alterative for the deranged functions of the body, but one meant primarily to strengthen and pro-

* *Must*, the unfermented, or only partially fermented, and new juice of the grape.

mote the well-being of the healthy frame, and at the same time intensify the sense of enjoyment of life. It is both an element of food and a luxury. Had I time, nothing would be more pleasing to myself than to illustrate by examples the wonderful and merciful providence of God in maintaining His creatures in existence, health, and comfort, through every zone, from the equator to the poles, supplying them with whatever is needful under the very altered conditions in which their existence has to be carried on. What animal fat, and oil, clothing of skins or feathers, are to the Laplander; what his starch, no matter whence derived, and his almost naked skin, are to the equatorial African; what his bitter beer is to the inhabitant of Northern Europe; that his wine, and a moderate quantity of animal and vegetable food, are to the inhabitants of sub-tropical climates all over the world. Again, if time allowed, it would be delightful to take up the line of illustration so exquisitely drawn by Mr. Babinet, of the Institute of France, and trace the action of Providence in the wool, hair, feathers, skin, and other integuments of animated nature in the several zones. But we can do no more now than allude to it. And so, if we reason consecutively, we shall find that every climate has its own appointed conditions under which alone the human economy will be healthy and vigorous. You cannot here subsist on the starch food which maintains in health and strength the inhabitants of equatorial regions; nor can you think of sustaining life for any length of time on the fish, oil, tallow, and dried flesh of the Laplander or man of Kamschatka. The beers and ardent spirits so much a *necessary* in moderation in cold and damp regions, and the strong tea of China, when taken constantly and in excess, produce diseases here, on which learned physiologists become eloquent, and from which are derived in no small degree the need of the physician, and the waste of health and the expense of sickness, to say nothing of the miseries of declining life. Health depends much upon the vigorous tone of the nervous system; the enjoyment of life wholly on that great instrument in the human laboratory—the liver. Tea, and such like, act strongly on the nervous system, but are comparatively harmless. Malt liquors and ardent spirits load the system with carbon; well enough for the production of animal heat, but not needed here, since the atmosphere supplies it abundantly.

When the temperature is not low enough to require a large supply of carbon to maintain animal heat, then, as the carbon must go somewhere, and be got rid of somehow, the liver and kidneys have to do the work, when they are, perhaps, already overtaxed.

I trust I am neither a theorist nor a quack. I hate quackery of all kinds, and my education has taught me that theories are worth little

more than that they serve to arrange and harmonize a certain number of facts. The fact in this case is, that liver and kidney diseases, nearly unknown in wine-drinking countries, are almost universal in these colonies, and either form the basis of prevailing complicated diseases, or are complicated with them. Beer and spirits have their work to do in cold and damp climates, not such as ours—intensely hot and dry. Wine has its beneficial work to do in Victoria, and it is gratifying to watch the steady progress hitherto made, mainly during the last five or six years.

Prejudices to be Overcome even at this Day.

I have taken a fair amount of trouble to ascertain the depth of prejudice against pure natural wine, formerly entertained by almost every grade and class of society in this and the neighboring colonies. It is fast dying out. I find in this city abundance of evidence on all hands supplied by the daily experience of the wine shops, that laboring men soon acquire a taste for it, and use it in preference to beer. Gentlemen put on their tables sound, good, pure wine, and they and their guests enjoy it; but there are two great bars in the way of the native pure wine obtaining all the reputation it is justly entitled to, and its legitimate use as food or a stimulant; and those are the customs and habits of society in relation to "the *proprieties* of the conduct of ladies," and the backwardness of the medical faculty in the matter of prescribing it for their patients when the proper time for the exhibition of wine has arrived. And to my knowledge, while some doctors occasionally recommend, and advise its use in private practice, they seem afraid to order it for hospital patients.

Against this backwardness the argument seems to hold good in this way, *i.e.*, if the patient need wine, let it be *pure, ripe wine*, not this brandied stuff of from 30° or 40° per cent. of indifferent alcohol. If the patient need a stimulant, begin with brandy and ammonia, &c.

The customary reply is, the patient will not take *that* wine of yours. I reply, by the same rule, that they take cubebs, and salts and senna. They will take it if you order it; but don't order it where a mere stimulant is wanted.

But the real misery is in the case of the middle and poorer classes of patients in private practice; members of clubs and their families. A case needing to be supported and strengthened occurs, and the medical attendant says, "Get a bottle of port wine." What, I may ask, do these people know about "*port*." They probably, in their hurry, give five or six shillings to a servant girl, or a member of the family, with orders

to run to the grocer, or the nearest public-house, and get a bottle of "*port wine!*"

It is got, and the nauseous stuff, most probably compounded in cellars not twenty-five miles from Melbourne Post Office, is entrusted to do for the patient what, in charity let us suppose, only pure fine wine *could* do.

I am writing no imaginary story. More than twenty-two years of sick rooms and hospitals have taught me something in this matter of "medical comforts and restoratives in Victoria."

A gentleman, now no longer in business, Mr. James Phillips, formerly my neighbor in Lonsdale-street, at that time a wine merchant, always had in his cellar a pipe of the *best* port wine for the *convalescent*, and none others. And though he would at that time, more than fifteen years ago, sell *one* dozen to a convalescent patient for the small sum of 30s. or 35s., money could hardly tempt him to part with a second dozen to the same patient. This was real unpretending charity, and I regret that this catholic practice is not universal among us here in Victoria.

British-bred Ladies in relation to Wine.

Ever since 1862, when colonial pure wine began to be pretty generally talked about, the lady portion of our community made no pretence of disguising their dislike of it. Taking it, as they had been accustomed to take a small glass or two of port or sherry, with fruit or a sweet cake, it did no doubt taste thin, poor, and sour; and as long as it is so used it will taste *thin*, *poor*, and *sour* to British-bred ladies, and not a few gentlemen as well.

In the case of ladies, there are two obstacles in the way to be removed before they will take to the pure wholesome beverage; and these are, first and strongest by far, the custom or fashion of British society, arising out of the fact that, for more than a century, only highly fortified kinds were to be met with, such as made it imperative on all who valued a character for sobriety to use them with the greatest moderation. Habits are soon formed and become universal, and are still in nearly full force in this community at the present day. "Wine," they tell us, "is *wine* everywhere." No distinction is made between what, as Druit writes, pp. 9, 10, "I will venture to call *pure virgin wine*, the refreshing beverage which a man *drinks at a draught*, with its 18 to 22 per cent. of proof spirit, and *strong* or *fortified* wine, the stimulating dram which he *sips*, pregnant as it is with its 35 to 45 per cent. of spirit. The two things differ *toto cœlo*." The sooner Victorian ladies realize the fact that they are inhabiting a country of

sunshine and hot winds, situate at an average of more than 16 degrees nearer the equator than that of their native land, the better for their own health. Still, I fear, habit and prejudice are stronger than reason and instinct. Yet, with a view to preparing the way, I will now pass on to the second obstacle, to which I alluded just now as necessary to be removed—Ignorance of what the proper taste of pure wine is, arising out of not knowing *how* to drink it, or not daring to drink it as it should be taken, with a view of quenching thirst and sustaining energy, and satisfying a natural demand. This natural demand for something is felt by all, and every day, but of course most during hot winds and sudden changes of weather. Recourse is then had to spirits, "a little and strong," and I fear then a little more!

Let it be premised that the gustatory organs of women are more sensitive than those of men. We all have two sets of these organs, one set at the front of the tongue, the other at the back or near the root. With the first we perceive sweetness and sourness mainly, but it soon overpowers the peculiar functions of the latter.

I am not sufficient of a physiologist to consider myself fit to explain the nature and peculiarities of the human gustatory organs; yet, while I leave it to the faculty to assign the causes, I have no hesitation in recording facts of every day's experience, and which can, at a moment's notice, be brought home to the senses of the most ignorant. I will select one example out of hundreds that might be adduced, because it is both most simple in itself, and the materials employed about it are within every one's reach—that of tasting (and I might say proving and testing) olive, or as it is generally called *salad oil*, a substance that in this climate ought, in one shape or another, to enter every day into the food of every one of us. Moreover, what I am going to say has as much to do with the grocer who purchases as the customer who consumes the oil.

To perform this testing of the goodness or badness of salad oil (pure olive oil), it is desirable, when possible, to dry the tongue well towards the base or root with a fine cambric handkerchief, for the obvious purpose of preventing the fluids of the mouth from preventing the oil coming at once in contact with the surface of the tongue. Then dip the point of the little finger in the oil to be tested, and apply it as far back as possible on one, or still better, *both* sides of the root of the tongue. Having done this, allow the mouth to remain open for a few seconds, when, if there be anything wrong with the oil, a well-marked sense of bitterness will be experienced, and the worse the oil the deeper will it be. Yet, if a teaspoonful of the same oil were put first on the fore part

of the tongue, no such bitterness would be felt, showing that the first taste of sweetness had deadened the other sense. The proof then of the suitability of salad oil for human consumption has to be sought in every instance in the above simple experiment. Reject all that gives a sense of bitterness on the root of the tongue; it is not fit for wholesome human food.

Though digressing a little from the purpose for which I instituted the above illustration of the two senses of taste, I will venture to add, as we British are not more an oil-using than a wine-drinking people in our native land, and therefore can hardly be acquainted with the experience and practice of nations where it enters so largely into daily consumption, and holds the place that butter does among us; that it should be carefully kept from sun-light; never put on our tables in glass cruets, as is the universal custom, but in either suitable glazed earthenware, or silver, or tin vessels; neither lead nor unglazed pottery should be in contact with it.

Supposing the above illustration to be beyond doubt, let it be applied to the present custom among ladies when taking wine. They *sip*, and find it sour. But if they took a good mouthful, and swallowed it at once, all the *aroma*, the bouquet, &c., would be pleasantly experienced and the sense of having a *mouthful of wine* unmistakably felt.

Early Study of Australian Wines, from 1859 to 1866.

I think, then, that any contribution to the further knowledge of this important branch of colonial industries will be of some use, and that I need no further apology for placing before the public an outline or *resumé* of my investigations, chiefly since 1866–7, in the plainest manner I know how.

In the month of May 1867, I read an essay on colonial wine before the members of the Royal Society of Victoria, which was afterwards published in the transactions of that body, circulated in pamphlet form by the late Board of Agriculture, and subsequently found worthy to be translated into German, which was done by Mr. Methe, and circulated among his countrymen. That essay, or paper, referred, in the first part, to certain studies of, and chemical investigations into, most of the leading characteristics of Australian wines that came to my hand between the latter months of 1859 and December 1866. Many of the samples tested were the produce of well known vineyards in New South Wales, the first and by far the largest number and variety being either "Camden Park" or "Irrewang or Kaluda" brands, introduced into Victoria by Mr. Blake, to whose enterprise in 1860, when colonial wine was another

synonym for anything detestable, the Victorian vignerons owe no small debt of gratitude.

These investigations comprised the specific gravity of each sample, its amount of absolute alcohol, unchanged sugar (if any), percentage of residue after evaporation, power of keeping and resisting acidity, and change of color, and especially its total amount of free acids, which was determined by alkalimetry, the standards of reference being port, sherry, hock, and tokay, supplied by the agent of the Messrs. McArthur, of Camden, the late Mr. Ralph Hutchinson, an educated and able judge of wine.

I record the above outline of the points I inquired into that others may follow the same, and, I trust, record their results.

With reference to the experiments to determine the power a wine had of keeping, after exposure to the air, and of resisting acidity, I would mention in this place, next after determining the quantity of alcohol, I sought for the amount of tannic acid that it contained. In the case of white wines, this was an easy matter, but difficult in the red. The following was the plan I adopted with the whites :—I took samples of good sound sherry, as nearly as possible of the same shade of color as that of the colonial wine I was going to test ; and after putting about equal quantities of each in wine glasses of the same size, I added to each an excess of carbonate of soda—say, a small tea-spoonful—a little too much makes no difference. After standing a few minutes, it will be easy to observe the depth of dark color shown by the sherry. Now compare this with the samples to be tried, and the greater or lesser depth of color in the samples will show how this important point in the keeping of wine stands. If the wine be paler than the standard of sherry, eggs or isinglass must on no account be used for fining. If the sample is perceptibly darker after adding the carbonate of soda, even then much caution is needed in using eggs, or any other albuminous substance, for these abstract the tannic acid by the chemical action they exert upon it.

Not living in a wine-producing country, the English people have no proper terms to express accurately many operations on wine, and thus such terms as "*fining*" have a more or less confused meaning. We say, when wine is rough, austere on the palate, bitter—"*fine*" it. White of egg, isinglass, bullock's blood, and milk, &c., will do the fining such wine requires. They will remove the tannic acid, and probably some others. Again, a wine, smooth and sweet to the palate, is muddy, off color, &c.: we say, "*fine*" it—and that means, clear it ; but in this case albumen, isinglass, &c., would ruin it, and sand or Spanish clay

is alone admissible. All fining is a sort of filtration; and as you cannot put the wine through an ordinary filter, you put a filter through the wine. The insoluble compounds formed by albuminous matters and tannic acid on one hand, and the sand or Spanish clay on the other, constitute such a filter.

Some Personal Matters.

I have been twitted at times by teetotallers with devoting too much attention to these matters; and certainly I can say with Cicero, "*Licuit otioso esse mihi;*" but I preferred to fill up my time in a way that was pleasant and instructive to myself, and not without showing a prospect of future utility to the country of my adoption. Mingled with the above was, very likely, a little harmless vanity; for in a new country, and a limited population, a little man is apt to delude himself by thinking that he is a big one; and I honestly admit that, while there might have been more experienced judges of wine and abler analysts than myself, I could hear, in 1860, of hardly one who knew anything of the young unmatured wines of Europe, and not one who, at the same time, could bring a chemist's knowledge to bear upon our produce. And, furthermore, I thought that vignerons would trust my statements, seeing that I had a character and public position to maintain, and, also, that I had not a pennyworth of personal interest in any vineyard or its produce. But I had another motive for taking up this subject—one not unworthy of a clergyman. Many years' experience had impressed on my mind that wine-producing countries, where wine is plentiful and cheap, are invariably remarkable for sober, healthy, and cheerful populations; that drunkenness is all but unknown, and many distressing diseases common among drinkers of beer and spirits in warm climates utterly unheard of.

It must also be conceded that there is a freshness and charm about the first investigation of objects, such as wines, which are liable to indefinite and almost innumerable varieties. In the circumstances under which the vine has been introduced into Australia, on one hand from old vineyards in the south of Spain and south of France, and on the other by Swiss and Germans from their own countries, mainly the Rheingau and the Tyrol, changes in the produce must of necessity occur. Change of climate, perhaps, more than anything else, affects the vine and its produce. Vines introduced by the Messrs. McArthur, of Camden, into New South Wales, and Mr. Gilbert, of Pewseyvale, into South Australia, originally from near Jeres de la Frontera, and a few varieties common about Roussillon, found themselves in climates not very different from those they had been taken out of. But when

these same kinds made their way into Victoria, circumstances were materially altered. As a rule, the vine brought from a warmer into a colder climate, deteriorates for some years, both in its growth and produce; and, on the other hand, those removed from a colder to warmer, improve. One remarkable instance of this is the Chasselas. It was brought to us, I think, originally from the northern, or at most central, parts of France, on account of its being a good table grape and a prolific bearer. But in France it yields a wine generally poor in quality, bad in color, weak, and with a mousy odour. And, indeed, for a length of time it retained most of these peculiar properties in the colder regions of Victoria. At a time when it was considered the correct thing to run down our native wines, I remember reading in *Melbourne Punch* a receipt for making colonial wine, much like the following :—"No. 1 Chasselas.—Take one gallon of cold water (Yan Yean will do), one pint vinegar, 2 lbs. sugar, mix, and add two dirty well-seasoned mouse-traps. Product equal to the ordinary run of this variety."

Anticipation of Future Success in Victorian Wines.

Yet this same Chasselas vine produces in our warmer climates—such as from Sunbury to Sandhurst—and with careful making, one of our very best wines; while in the medium and cooler ones I note its improvement in all the best vinous properties from year to year. This is due, no doubt, to the vines having become acclimatized, and to more extensive experience in the making and maturing of the wine. If this colony ever produces novel wines that will distinguish it in the market of the old world, Chasselas will be prominent among them. Another instance of a vine that we have received from France is the Aucarôt. This pre-eminently requires a warm climate—such as from Sandhurst all along the valley of the Murray—and produces a wine that will most likely be the first to attract attention as a peculiar product of our country. Properly made, it yields a *medium* sweet wine, of good body, of a dark, golden yellow, and having a bouquet that resembles that of a *handful of new sweet hay*. It is, moreover, one of the few kinds that can be safely used in moderate quantity for blending with either white or red wines. But all the samples I have seen of it from our colder climates have been poor and hard, as have also been some from about the Murray, where the attempt had been made to render it prematurely a *dry* wine. The awards of the late wine jury of the Board of Agriculture, 1870, bear out my observations on this head, and those samples still in my possession are sweety-sour, one of the worst of bad properties. This is due to bad making. Many other varieties of imported vines from different parts of

Europe will, no doubt, show, if they have not already shown, marked changes; and let us hope for the better.

I extract the following from the jurors' report, 1870 :—

"As prize-takers for Victoria, the wines at the Great Agricultural Wine Show, 1870, rank as follows :—

Hermitage (pure or mixed),	6	prizes,	7	honorable mention	
Mataro	2	„	1	„	
Gamai	1	„	1	„	
Reislings	4	„	1	„	
Chasselas	2	„	1	„	
Verdeilho (pure or mixed)	2	„	1	„	
Pineau (or mixed) Rousette and Tokay	each 1 honorable mention.				

"It will thus be seen that the Hermitage, Mataro, Reisling, and Chasselas stand most prominent; but it is evident that the wines of the same name had changed their character in each district, thus producing many varieties. This is the most important point in the Exhibition to the vignerons; and although it cannot be denied that many of the wines are very fine, this variety is a great drawback, which it is for the vignerons to remedy. To make their wines marketable for foreign countries, the first condition is uniformity; and to attain this, the vignerons should set to work without delay. We would suggest that in each district an association be formed, whose sole object should be to ascertain, by careful examination over two or three years of the wines produced, the most suitable grape for their particular district. Having ascertained this, they should lose no time in reorganizing their vineyards, according to their means, by planting no other than the grape selected for their district, and by grafting it, a certain proportion in each year, on to their old vines. By this means, in ten, twelve, or even fifteen years, each district would excel in its particular kind of wine, as the Rhine produces hock; Bordeaux, claret; Burgundy, burgundy; the Douro, port, &c.; and our wines would then, through the agency of our wine merchants, be introduced into the home markets, which will never be done to advantage unless what we have recommended is carried out."

The peculiarity of our red wines, and the same may be said of Australian red wines generally, is a slightly earthy taste. Now this I believe to be due to the faulty manner of making, and the want of knowledge in maturing the wine, more than to anything derivable either from the air or the soil, or the variety of grape used. I have noted, however, that Mataro is generally the least affected by it, and Malbec the most. Red wines made by Mr. C. Maplestone, at Ivanhoe, from grapes well matured in a small, well-sheltered vineyard, and carefully chosen, on a plan substantially the same as that recommended for a like class of wines by M. Casalis Allut, were as nearly free from this objectionable taste as any I have met with. It may, however, be said that much might be done in making fine wine in a small vineyard, and under all the most favorable conditions, and to a certain extent this is true.

But by adopting a plan in many of its points the same as that of Casalis Allut, and on the large scale, S. Baldini, the able *feitor* of the Hon. J. G. Francis, at Sunbury, has produced red wines that commanded the admiration of the judges who examined the Victorian wines at Sydney in 1870. I know not the plans adopted by Weber Brothers, August Heine, Heine and Greiffenhagen, whose red wines were nearly free from this *gout de terrain*, but think it cannot be very dissimilar. As the red wines have to be fermented on the skins to give them color and tannin, there is reason to fear they mostly receive more or less injury from the thick "cap," as it is called, which is formed by the husks and stalks on the top of the vat. To obviate this, the best French makers keep this "cap" pressed down below the surface of the fluid, so as to prevent any air from touching it, by means of a false lid, a little smaller than the diameter of the vat. This lid should be forced down a few inches below the surface of the must, and the vat finally covered with some thick cloth, such as a horse rug or two. I state this, because, as a precautionary measure, it is of value, and the cost of it is trifling. I have for several years been trying to ascertain if this earthy taste is due to any change in the tannic acid, such as oxidation of a portion of it into some higher form, such as gallic acid. But I am not yet prepared to say with certainty that it is. My opinion, based on some results obtained within this year, inclines to this change. It must be remembered that fermentation frequently becomes very violent in Victoria, and when matters are in their transition state, it is hard to tell what may happen. Moreover, we are not yet certain as to the part played in the tumultuous fermentation by gummy matters and others in a transition state from acid to sugar. Mr. Baldini acts, in my judgment, wisely by gathering his red grapes only when warmed by the sun and perfectly dry, breaking the bunches as little as possible, packing them in the vats, covering the vats when full with thick woollen rugs, and leaving them so for a few days "to sweat." In this interval much of this transition matter, and many not perfectly ripe grapes, will be brought into a perfect condition.

There is now no doubt on my mind that the red wines of Victoria may be vastly improved by the careful study by intelligent vine-growers of the condition of ripeness of grapes, methods of crushing, vatting, and storing of their produce, in relation mainly to climate. The French methods of making red wine in most places, south of the dividing range, seem the best. The German methods, as in use on the Rheingau, turn out the best white wines south of the dividing range, and the Spanish and Portuguese ones for the north. Of course there will be spots, north

of the dividing range, that will yield some varieties of dry wines ; but, as a rule, it is merely torturing the musts of high saccharine strength, in a necessarily hot climate, to attempt to make of them wines of the hock and sauterne character. The Spanish grapes, which produce the manzanilla, would probably yield a dry wine there.

Wines left after the Exhibition of 1866–7 for Future Study and Report.

There were sent to the International Exhibition of 1866–7 not a few samples of red wine from the north of the dividing range—Hopwood's, of Echuca ; Guppy's, of Benalla ; one or two of Piper's, and some others —that obtained no distinction whatever at the time. These were pure and simple wines—well made, but, being young and full-bodied, they needed care and keeping. But after lying quiet for five years, they proved to be quite equal to the very best sent to the Exhibition—wines quite ripe at, say, six or seven years old, that would be a credit to the colony in any country in the world.

It is frequently remarked that the produce of young vineyards becomes drinkable, and matures sooner than that of old ones ; and all my observations go towards confirming it. There are no old vineyards in Victoria, and very few in Australia. There can be but three or four in all, that date back twenty-five years ; but there are a good many of ten or twelve years. Now I understand by the produce of young vineyards those not older than their third year of bearing. The produce of such as these does soon ripen, and it also soon passes its best, deposits coloring matter, and becomes thin and poor, though it may retain its distinctive bouquet. It is, perhaps, providentially so arranged, that the cultivator may not lay long out of a return.

One important object which I proposed to myself in studying the samples left with me at the close of the International Exhibition, 1866–7, was to watch from time to time, and ask the opinion of good judges *when* they considered a sample was at its best. The declared ages of all were marked on the labels. This has been done. Not one of them, whether red or white, *improved* after its eighth year, and but very few showed decided signs of decay at that age. In every instance those which held their own were from *rather* sweet to sweet kinds ; and were, with two or three exceptions, from South Australia. The whites kept their properties longer, and in higher perfection, than the reds.

Prominent among the old white wines were those of Messrs. Patrick Auld (Auldana) ; Gilbert's Verdeilho and Reisling ; Peake's Reisling,

Verdeilho, Palomino Blanco, and Pedro Ximenes, and one sample of strong sweet Gouais ; Greig's, of Dirlton ; Smith and Son's Sherry ; one Highercombe white, and two, known only at the time as AB and AZ, afterwards found to be the produce of Morialta, the vineyard of the late Hon. John Baker ; and the last of the South Australians, Messrs. Winkel's and Charlesworth's samples of pure Tokay. With the two exceptions of the Highercombe and Morialta, the rest all partook of the character of sweetish wines, and two only contained less than twenty per cent. of proof spirit.

The commissioners for New South Wales and for Western Australia removed their samples remaining at the close of the Exhibition of the wines from those colonies, and I had to do the best I could with a bottle or two of Bukkulla, a few of Carmichael's, and one or two of Doyle's Kaludah. No doubt all these were fine wines, and I regretted then and since that I had no chance of thoroughly studying the king of New South Wales wine—the Bukkulla white.

The Victorian wines, up to six years of age, held their own very fairly, but hardly more than three could be said to be on the improving side at the end of another year, that is, when about eight years old. Of these three, one is a white wine of the late Mr. Hopwood's of Echuca, a notoriously bad sample *originally*, and not good even now ; one or two of Weber Brothers' ; Depury and Langdon's white Hermitage ; and one of August Heine's. These seemed to improve to the last. Of the rest, one or two of Mr. Trouett's of St. Peter's Vineyard, Great Western ; one of Dunoyer's, a few of Mr. Kitz's, one of Heine and Greiffenhagen's, and one of Galland and Junod's, of Pollocksford, Geelong ; two of Meredith's, of Chewton ; two of Dr. Hope's, of Batesford ; and Billing's Shepherd's Reisling, held their own up to about six years, but, for the most part, were then quite up to, if not past, their best.

Owners of vineyards and traders in colonial wines who are looking for foreign markets may, I think, not unprofitably make themselves acquainted with the above results obtained in wines sent for exhibition ; and, naturally, the best only in each owner's estimation would be sent. Nay, more, all these were bottled, and have been carefully put aside in a cellar of equable temperature, in the foundations of the Exhibition Building. It is not unfair to conclude that the circumstances I have just mentioned place these samples in a far more favorable condition than they would have been had they been shipped to Europe in wood, tumbled about after arrival, and finally bottled and put aside.

The details of distillation of a few bottoms of bottles below show the power of several of these samples to resist acescence. That is a great

matter truly. But what I wish to state here is, that few showed any striking likelihood of improving after six years of age.

Opened 1866. *Distilled in* 1869–70.

Name of Grower.	Name of Locality.	Name of Wine.	Spirit Strength.	Retained Color fairly.	Lost Color.	Age of Vintage.
Randall ...	Glen Para, S.A.	Hermitage ...	19·3	Very fairly	...	1865
„ ...	„ ...	Hermitage and Carbinet	18·9	...	Lost a good deal	1863
„ ...	„ ...	Reisling ...	20·3	Color good	...	...
„ ...	Randallsen	Mataro ...	18·2	Good red	...	1864
Auld ...	McGill ...	Auldaner ...	22·3	White ...	...	1863
„ ...	„ ...	„ ...	20·6	„ ...	...	1863
„ ...	„ ...	Mixture Brown Portugal and Carbinet	18·1	...	Lost color to brown sherry	1862
Peake ...	Clarendon	Palomino Blanco	20·3	White ...	...	1862
„ ...	„ ...	Verdeilho ...	23	„ ...	...	1863
„ ...	„ ...	Pedro Ximenes	20·2	„ ...	...	1863
Noltenius	Adelaide ...	Red ...	17·2	Kept color	...	1863
„ ...	„ ...	White ...	...	...	...	1863
Sangar, N.S.W.	Wahgunyah	Aucarôt ...	15·3	Kept color yellow	...	1863
„ ...	„ ...	Reisling ...	18·7	White ...	...	1864
„ ...	„ ...	Hermitage ...	19·3	Kept color fairly	...	1863

Special Remarks on Wines from Clarendon Vineyard, S.A.

The interest I took in the produce of a vineyard, belonging to a fellow collegian, made me subject his wines to an especial study on his own account. But after I had made personal inspection of nearly all the vineyards lying within a radius of fifty miles around Adelaide, I arrived at the conclusion that Clarendon was a fair representative district for that portion of South Australia. Situate in the gentle hills looking over the pretty hamlet of Clarendon, and bounded on one side by the Onkaparinga River, the vineyard rises somewhat steeply to at least 150 feet from the cellar, which is placed at the lowest part. It is about fifty acres in extent, and, with its surrounding of olive trees, realizes fully what one writer called it, "a gigantic pyramid of luxuriant verdure." Far cooler than the plains surrounding the capital, and by no means so cool as many vineyards on the Barossa Range, it is, to my mind, a fair exponent of the average wine districts of South Australia. Hence I have studied Clarendon wines because of that characteristic also.

I trust I shall not be misunderstood by wine men, either in South Australia or Victoria, because I have selected the wines of a personal

friend for especial study. It must be borne in mind that the examination of wine (though but partial) involves much time and some expense, both of which fall on me personally, and that in such cases extreme and exceptional defects, or excellences, must give way in the main to a fair average.

In the tabulated statements next following those of the Clarendon wines will be found the detailed record of the spirit strength of a considerable number of samples of South Australian and Victorian, and also a few from New South Wales and Western Australia.

The following are the Clarendon wines, distilled by E. J. Peake, Esq., in 1869, and nearly all by me in 1870–1, the instruments used being Saleron's smaller and larger still; spirit strength estimated, in some instances, as will be observed, according to tables calculated by Gay-Lussac; in others, according to Sykes' (the English standard); and in a few according to Long's balance, and mostly the mean of the three given. Those results obtained by me are recorded according to Sykes' strength only, and where a mean is given, it is the mean of two or three distillations of the same samples with the same instruments.

Name of Wine Distilled.	Hydrometer used.	Percent. of Proof Spirit.	Mean.	Age of Wine.
1. Temprana	Gay-Lussac	27·1	26·86	1867
	Sykes' scale	27·5		
	Long's balance	26·0		
1. Temprana, No. 1 hhd. for England	Gay-Lussac	23·6	24·66	...
	Sykes' scale	25·7		
No. 2 hhd.	Long's balance and slide ruler	24·7		
3. Ditto, No. 3 hhd. ...	Gay-Lussac	25·3	25·46	...
	Sykes' scale	25·8		
	Long's balance	25·3		
Verdeilho, No. 1	Gay-Lussac	23·6	22·9	...
	Sykes' scale	22·6		
	Long's balance	22·7		
Ditto, No. 2	Gay-Lussac	23·6	23·3	...
	Sykes' scale	23·0		
	Long's balance	23·4		
Ditto, No. 3	Gay-Lussac	23·6	23·3	...
	Sykes' scale	23·0		
	Long's balance	23·4		
Temprana, No. 4... ...	Gay-Lussac	25·3	25·3	1867
	Sykes' scale	25·7		
	Long's balance	25·9		
Red wine, No. 1	Gay-Lussac	21·9	21·5	1867
	Sykes' scale	21·2		
Ditto, No. 2	Gay-Lussac	21·9	21·5	1867
	Sykes' scale	21·2		

Name of Wine Distilled.	Hydrometer used.	Percent. of Proof Spirit.	Mean.	Age of Wine.
Grenâche, No. 1	Sykes' scale	23·6	23·4	1867
	Gay-Lussac	23·2		
Ditto, No. 2	Gay-Lussac	21·9	21·8	1867
	Sykes' scale	21·8		
Reisling...	Gay-Lussac	23·6	22·9	1869
	Sykes' scale	22·2		
Verdeilho	Gay-Lussac	28·8	28·3	1869
	Sykes' scale	27·8		
Palomino Blanco... ...	Sykes' scale	21·0	21·4	1869
	Long's balance	21·8		
Temprana	Gay-Lussac	27·0	25·9	1869
	Long's balance	24·8		
Temprana, soon after its first fermentation	Gay-Lussac	23·6	23·3	1869
	Sykes' scale	23·1		
Red wines, Nos. 1 and 2 ...	Long's balance	23·3	23·0	1869
	Sykes' scale	22·7		
Grenâche	Gay-Lussac	25·3	24·9	1869
	Sykes' scale	24·6		

Taking the total as obtained by all the several instruments used, it is 24·265; but if we pick out those reported at Sykes' strength, it is found to be 23·625. Now this is just ·955, or substantially one per cent. higher than the general average of South Australian wines hitherto studied.

Elements affecting the Keeping of Wine.

Now as the spirit and tannic acid have so much to do with the keeping of wine, upon which depends, in no small degree, its power of travelling, and therefore its fitness to be sent into any foreign market, I thought it most desirable that these two points should be well attended to; and to them I have directed my attention, as the following tables will show. I premise, however, that, in the instance of white wines, the standard of tannic acid was that of good old sherry and Madeira for the sweeter kinds, and Deinhard's hock for the harder Reislings, Chasselases, and Pineau Blancs. I treated only such as were free from any taint of acetic change. Now I found hardly one that fell below the above-named standards.

For the red varieties I had to adopt other and more complicated methods of forming a fair rough estimate of that element—white of egg, in some instances; filtration through animal charcoal, and subsequent treatment; the examination of the residue after distilling off the spirit,

&c. In fine, I am satisfied that nearly all of them contained tannic acid enough for home purposes, but hardly enough for exportation to distant countries. Red wines to be sent abroad in bulk should be rough to the taste.

In considering the excellent effects of tannic acid on wine meant for long voyages, I am bold to advise that all such should on no account be "*fined*" with white of egg or any albuminous matter, but well separated from the natural deposits of dregs by racking at proper seasons; nay, more, I feel certain that if ordinarily prepared tannic acid, that may be procured from any druggist, were dissolved in wine brandy, and a proportion (say a bottle) to a hogshead of wine added, instead of the two or three per cent. of spirit, the consumers at home would find a more agreeable article. Of course the quantity per hogshead of tannic acid added should be made known to the agent, that he might have it removed to suit his customers, in the ordinary way, by "fining" it with a proportion of white of eggs. Nothing is more certain than that the quantity of superadded tannic acid can be completely removed from the roughest or the most delicate of wines. The above observations apply to wines sent in bulk, not in bottle.

Were the above directions made the subject of an experiment or two on pipes or hogsheads to be sent to Europe, I feel all but certain the result would show how needless it is to fortify wine for exportation, and what a saving in the cost of spirit alone it would prove to the exporter.

These tables relate to wines sent in to the Intercolonial Exhibition 1866–7, and were operated on from time to time since, as opportunity proved favorable, not a few having been distilled several times over, and different bottles used. The end in view was to test how great were the differences observable in the produce of all the colonies.

Name of Maker.	Name of Wine.	By Sykes' Hydrometer. Spirit Strength.	Mean.
New South Wales.			
Wyndham, Messrs. ...	Bukkullah, Red ...	19·6 20·4	20·
,, ...	,, White ...	23· 22·4	22·7
Doyle, J.	Kaludah	19·5	
Marie, Louis ...	Muscatel	24·3	
Carmichaels, — ...	White	23·5	
Fallon, J.	Reisling	22·3 24·	23·6
Lindeman, H. J. ...	Cawarra	20·4	
Macarthur, Sir W. ...	Reisling, 1856	24·5 24·2	24·3
	General mean of samples treated ...		22·16

Name of Maker.	Name of Wine.	By Sykes' Hydrometer. Spirit Strength.	Mean.
WESTERN AUSTRALIA.			
Hardy, Joseph ...	Red Wine	24·1	
Clifton, —	Verdeilho	23·5	
Wayler, Dr.	Muscatel	24·35	
	General mean		23·983
SOUTH AUSTRALIA.			
Peake, E. J.	Red and White	15 samples	22·13
Auld, Pek.	Auldana, 1864	17·4	
„	„ White ...	23· 23·6 24·8	23·8
„	„ Red	20·3 22·4 22·7	21·46
Baker, John	A.B. Morialta	23· 23·6	23·3
„	A.Z. White	23·5 22·8	23·15
Fisher, D.	Roussillon	26·3 21·3	26·3
Scott, R. and J. ...	Hermitage, 1864 ...	25· 24·8	24·9
Randall, David ...	Glenpara, White ...	18·8 19·	18·9
„ ...	„ Red	17·3	
„ ...	Marked F, Red ...	25·7 26·3	26·2
„ ...	„ G, Red ...	26·1	
„ ...	Reisling	20· 19·2	19·6
Callender and Co. ...	Auldana, 1863	22·6	
Smith and Son ...	Sherry	23·3 23·	23·15
„ ...	Hermitage	24·	
Ross, R. D.	Highercombe, White ...	22·8 22·5	22·56
„	„ Red ...	21·6 21·7	21·65
Martin, W.	Dulcetta, Red, 1864 ...	24·2 23·7	23·9
Stead, J.	Hermitage	24· 23·9	23·93
Greig, A.	Verdeilho and Frontignac	25· 24·3	24·6
Greig, W.	Reisling, 1862	24· 24·1	24·05
Hunt, F. R.	Madeira	23·	
Charlesworth, T. W. ...	Tokay (a fine wine) ...	22·1 22·6	22·35
„ ...	Reisling	23·4 23·5	23·45
Gillard, J.	Hermitage, 1863 ...	25·2 24·9	25·05
„	Mataro, 1861	24·6 24·	24·3
Winckel, F.	Old Tokay (a splendid wine)	23·9 23·3	23·6
„	Newer Tokay	24· 22·9	23·45
Gilbert, J.	Reisling, 1860	20· 20·3	20·1
„	Verdeilho, 1860 ...	21·5 21·	21·25
„	Reisling, 1864	21·6	
„	Carbinet	22·4	
„	Seyras	23· 23·3	23·15
Green, W.	Reisling, 1862	23·8 22·9	23·35
	General average		22·67
VICTORIAN.			
Guppy, —	Hermitage, 1865 ...	23· 23·3	23·15
Hopwood, —	Echuca, Red	25·2 24·8	25·
Galland and Jarrard ...	Hermitage	22·1 22·6	22·35
Weber Brothers ...	Hermitage, 1865 ...	21·3	
Hope, Dr.	White Wine	22·6 22·1	22·3
Dardell, J. H. ...	Shiraz, 1865	20·7 20·2	20·4
Adams, R.	Hermitage	21·6	
Bear, T. H.	Mataro	20·1	
Knight, G. W. ...	Hermitage	23·3 22·9	23·1
„	Pineau Blanc	21·5	

Name of Maker.	Name of Wine.	By Sykes' Hydrometer. Spirit Strength.		Mean.
VICTORIAN—*continued.*				
Piper, W.	"Perseverance," White ...	19·	19·5	19·25
„	White Muscat	20·4		
Richmond, J. ...	Chasselas	18·8	18·2	18·5
Reid, Curtis	Muscat	23·1	23·	23·05
Heine, A.	Reisling, 1866	21·8		
„	Chasselas, 1865	20·3	20·6	20·4
Klemm, —	Reisling	19·9	20·2	20·05
Heine and Greiffenhagen	Hermitage	24·1	23·4	23·75
„ ...	Burgundy	23·	22·4	22·7
Panton, J. A. ...	Hermitage	24·1	24·	24·05
„	Mataro, 1866	21·4		
„	Burgundy	22·7	22·3	22·5
Vlaeminick Brothers ...	Red Wine	24·6		
Meredith, T.	Tokay	23·8	24·1	23·95
Depury and Langdon ...	Verdeilho	20·3		
Ross, J. and Co. ...	Hermitage	18·9	19·4	19·1
Pin, J. B.	Chasselas	19·3		
Elliott, S.	S.E. in diamond ...	20·4		
Everest, T. J. ...	Mataro	19·6	19·3	19·4
Maplestone, C. ...	Hermitage	21·8		
Murray, A.	Mataro	21·4		
Moody, Fred. A. ...	Burgundy	22·5	22·	22·25
	General average			21·77

It will be remarked, in the above tables of spirit strength, that the highest average strength is found in the produce of Western Australia, it attaining nearly 24 per cent., actually 23·983. Next comes South Australia with 22·67. Third in order is New South Wales, 22·16. Lastly, Victoria shows only 21·77.

Western Australia.—Probably the average for Western Australia would have stood somewhat lower, had a larger variety of samples been available. Still it is not much matter for wonder that the produce of that colony stands so high for pure wine, if we remember its geographical situation, and the fact of the great radiation of heat from the sands near Perth, in which vicinity the vineyards above-mentioned are situated.

New South Wales.—The eight samples of New South Wales wines distilled, though but few for so old and so large a wine country, represent fairly the best-known varieties ; and, from the different districts whence they were obtained, may not unfairly be said to be representatives of the produce generally. They were, without exception, first-class wines in their several kinds. Average strength, 22·16.

South Australia.—By far the largest and most interesting collection of wines sent to the Intercolonial Exhibition, 1866–7, came from South

Australia. Their variety was striking, their *range* of spirit strength surprising, and their general character very good indeed.

It was to these wines that I looked for information for our Victorian vignerons ; for though no inconsiderable number of the South Australian vineyards have been formed in situations whose annual average heat is, perhaps, higher than any Victorian, yet those situate on the high and exposed hills are as cool as the districts about Geelong or Yering ; so that there is not so very great difference, on the whole, as regards the vineyards now in existence in the two colonies. The Auldana, Morialta, Highercombe, and Pewsey Vale growths find analogues, if not their counterparts, in the Barrabool Hills and Yering, and their equals at Ivanhoe, near Melbourne. The difference in spirit strength, as obtained from the general average, is 0·39 in favor of South Australia.

As to the keeping power of South Australian wines, it was excellent wherever the tannic acid was present in its normal quantity. But, with the exception of very sweet, luscious wines, like those of Mr. Stead, I cannot say that any of them continued to improve after the sixth or seventh year. I have no means of knowing how they would improve in bulk. I can only speak about bottled samples.

Speaking of the white wines very generally, I found in the prevailing character of the bouquet something to remind me of the faint odour of apples. Could this be malic æther, formed by a portion of the malic acid on the spirit in a nascent state ? And if it be disliked, could it not be removed by the use of small quantities of partially calcined gypsum during the pressing.

Not a few of the reds either had already, or soon after the bottle was opened, acquired a very distinctive smell and taste, which were not pleasing to every palate. Some persons, not professed judges, called it smoky, others leathery. But the acquiring of this in no way affected the *keeping* of the wine. Both in the instance of South Australian and Victorian produce I conducted a long series of chemical experiments, with a view of determining whether this peculiarity was due to some alteration in the tannic acid or not ; for instance, the oxidation of it into some higher form, as gallic acid. It very generally occurs in Victorian red wines, but at first has more of an earthy quality. But my results hitherto are not conclusive. I have also consulted all the best and most recent works of the Portuguese œnologues, and find Senhor Lapa, Professor of Chemistry, and Royal Commissioner for Vineyards and Wines, attributes it in Portugal to the conversion of a portion of the tannic acid into alcohol ! To whatever cause it is due, the vineyard proprietor should never rest till he has found means of getting

rid of it. The French method of fermenting red musts advocated by Mr. Casalis Allut, and to be found *in extenso* in the last useful volume which Dr. Kelly has contributed to our scanty libraries of works on "Vines and Wines," seem, from points of reason, to be by far the best, and if needed in any one colony more than another, I should consider that one to be South Australia.

Last in the relation of average spirit strength comes the products of Victoria, with an average of 21·77. Though not quite so numerous as the South Australian, it represents not inadequately the produce of this colony. Stated in general terms, the Victorian wines are wonderfully good in their several kinds. But it must be observed, *in limine*, that whether light or full-bodied, they are the produce of French or German vines. Hardly any other, except the Verdeilho (Madeira vine), is to be found as a standard sort. Not a few vineyards in South Australia, such as that of Sir George Kingston, Mr. White, &c., contain nothing but Spanish kinds; and Clarendon, Pewsey Vale, Morialta, and Highercombe, have mixtures of these with French; so it is impossible to institute exact comparisons. Yet from the circumstance of the Spanish vines being grown for the most part in hot situations, with plenty of lime in the soil, and the mode of treating the musts being more German than Spanish, these vineyards turn out white wines as fine and delicate as any that have been produced at Yering or the Barrabool Hills, but of course of a different bouquet, and slightly higher alcoholic strength. No matter how remote Victorian wines may yet be from the glorious bouquet of Deinhard's or the Johannisberg Hock, the produce of the south side of our dividing range comes the nearest to them of anything south of the equator. But if the treaters of the Spanish produce in South Australia only understood the requisites for managing their musts as such are created in the instances of Manzanilla (the bitter, fine, hard wine, so called from the *bitter* partaking of the character of camomile); the Montilla, another dry wine; and the Paxarete, a medium sort; it is hard to understand why these light firm sorts might not be supplied abundantly.

In the valley of the Murray, all the Spanish vines would have a fine chance; for there, a deep gravelly soil, heat and shelter, and no hot winds, would indicate their natural home. And if ever the produce of this colony is to rapidly supersede the hot brandied sherries, and retain the pure sherry flavour without the adventitious impure alcohol, it is clear that from Sandhurst and Benalla to the Murray the requisite conditions must be looked for.

Special Remarks on certain matters affecting Victoria Wines.

Among the kinds to which I have devoted time for a more than ordinary study in this colony are, as white wines, the Chasselas, the Aucarôt, the Shepherd's Reisling; and in reds, the Mataro, the Grenâche, and the Donzellinho (black Portugal). The Chasselas is in this colony one of the most useful grapes; it is a first-rate table grape, and will await the convenience of the wine-maker without complaining, for a week or two, and the produce is frequently excellent.

If ever Victoria gains a name in the world's markets for any distinctive growths, the two first I prophesy will be, Chasselas and Aucarôt; and the third, Shepherd's Reisling, or some blend of it. As yet nothing has come to my knowledge sufficient to mark a distinctive character upon any of the red kinds, except perhaps Grenâche. It yields enormously; and, in rich soil and warm localities, appears to have improved in the quality of the wine. I have met with a few samples, from Echuca and South Australia, that possessed a well-marked character; and in 1866–7, a medal was awarded to a sample grown at Clarendon, South Australia.

Concerning the blending of wines for the production of better results and greater varieties, and also for supplying a *uniform article*, when one has been found to suit a particular market, much remains to be said, which cannot, however, be attempted in a short essay like the present. This much, however, may be placed on record—that until this branch of the art of wine-making and preparing is carried out, the present universal complaint will continue to be as universal as ever, both among our own and foreign consumers: "We can never rely on getting the same colonial wine twice together." "We have no sooner become accustomed to a particular kind that suits us than we are informed there is no more of it." Now, on the other hand, when a Portuguese or Spanish house finds that an article has "taken," the very same can be supplied for ever if it continued to be popular in the market. Duff Gorden's sherry, Hunt's and Offley's ports, &c., come to us year after year the same. To do more than hint at this point would inevitably lead me beyond my limits. Hitherto I have found, by experiments, only two white wines that I consider perfect for blending with red wines—Aucarôt and Shepherd's Reisling.

One cause of the want of uniformity in the produce of many of our vineyards, is the great variety of kinds of vines to be found in not a few of them. It is a mistake to allow this practice to continue one season longer than is necessary to ascertain two things—1st. Which of

two, three, or four kinds yield the best wine in the particular locality ? 2nd. Which, bearing the above in mind, resist disease the best ? Graft all the rest with these kinds. Were something of this nature done, and a distinctive character stamped on the produce, and consequently an almost regular demand created for it by customers at home or abroad, there would remain no reason why the banks should not advance upon the stock in cellar as they do in Spain and Portugal, and as they do here on wool and other merchandise.

I would now direct the attention of the reader back to the "tables of spirit strength," and to the general averages which I have recorded. I hardly need say, that I took all care when distilling that lay in my power. From time to time one or two were subjected to actual balance-weighing, to satisfy my own mind that the hydrometer was correct, and that I was not led into error by such a thing as air-bubbles, produced when diluting the spirit with water, or by plunging in the hydrometer—the two fruitful sources of error. In either case the spirit strength would be altered. In thus directing attention to this important element in wine, I would add that I know I am open to much criticism—still, facts are facts. Exceptional samples, made rather from raisins than naturally ripe grapes, when their elements were all nicely balanced, I have found yield over 26 per cent. I take the following from Dr. Druit's fine little work on wines:—"When we look through Mr. Keen's report on the wines which were sent to the International Exhibition, London, from almost every country *except Spain and Portugal* (from which *no samples were analysed*), we shall see that, although from southern countries, as Italy and Algiers, the average is a little higher, and on the Rhine and Moselle a little lower; still the fact remains, that of 569 samples of liquid sent to the International Exhibition, as *wine* from France, Italy, Germany, Austria, and our own colonies of Australia—all, in fact, but a few exceptional specimens—yielded 18 to 22 *per cent.* of proof spirit." (Druit, pp. 9, 10.) Now, in order to fully appreciate any question about cheap wine, we must fully realize the distinction that exists in composition, properties, uses, and doses, between what I will venture to call *pure virgin wine*, the refreshing beverage that a man *drinks at a draught*, with its 18 to 22 per cent. of proof spirit, and *strong* or *fortified* wine, the stimulating dram, which he *sips*, pregnant as it is with its 35 to 45 per cent. of spirit. The two things differ *toto cælo*.

I could have wished to insert a complete list of vines which yield the wine best known to Englishmen, but have been able to verify only a few kinds, either here or in South Australia.

Spanish Varieties of Vines known in the Colonies.

The grapes which enter into the Spanish wines we call sherries are, as the *basis* of sherry—

1. Palomino Blanco.
2. Pedro Ximenes.
3. Temprana (meaning *early*); it differs apparently from Palomino Blanco only in ripening earlier.
4. Doradillo, a capital bearer.
5. Jaen.

With the solitary exception of Pedro Ximenes, I am not aware if any of the above kinds of vines have been successfully planted in Victoria. But there are plenty of places north of the dividing range where they would succeed—the old diggers' spoil-heaps about Huntly, for example—and probably yield a fine light wine, in character not unlike Manzanilla. In South Australia they produce light wine somewhat of the above character and strength, and, to my mind, are among the most agreeable and distinctive in character, as white wines, that I remember to have seen from that colony.

French Varieties of Vines.

There is hardly a popular variety of vine in France that has not been introduced into Victoria, all of which succeeded south of the dividing range. Hermitage (often called *Scyras*), Miller's Burgundy, Carbinet, and Sauvignon, with now and then Malbec, are common, and yield well. The Pineaus grow well, and some day will be the foundation of Champagne and other effervescent sorts.

Portuguese Varieties of Wines.

The district whence come the finest Port wines is that of Traz os Montes, and they are made from the following kinds of grapes. I translate from the report of the Viscount Villa Maior, Professor of Chemistry in the Polytechnic School, to whom was deputed the examination of the processes of wine-making of the above-named district, called also the *District of the North*. In passing, I would submit that the Portuguese Government departments might help us in these colonies to a bit of common sense, in the selection of members for appointment as Royal Commissioners, in the matter of agriculture at any rate :—

"His Majesty the King of Portugal has vouchsafed to appoint, through the Minister of Public Works, Commerce, and Industry, a Commission, composed of the Viscount Villa Maior, Professor of Chemistry in the Polytechnic School; John Ignatius Ferreira Lapa, Professor of Agricultural Chemistry in the General Institute of Agriculture; and Antonio Augusto de Aguiar, Professor of Chemistry in the Polytechnic School and Industrial Institute, in order to visit, during

the time of the vintage and of the wine making, the principal wine districts of the kingdom. The department allotted to Viscount Villa Maior is that of the districts north of the Douro; Antonio Augusto de Aguiar, the district comprised between the Douro and the Tagus, except that of Lisbon; and John Ferreira Lapa, the district of Lisbon and the other districts lying south of the Tagus. The Commission will draw up a report embodying its labors and studies, and forward it to the Government not later than 15th November. Commission dated 10th August 1866."

I consider the above a model of a working Royal Commission! Work, report, and all finished in three months. Returning to the "*studies and labors*" of Viscount Villa Maior, he says:—"The predominating kinds of grapes in this region are, among the reds, one called Alvarelhaõ, the Bastardo, and some deep red kind they call Molle (soft). And among the white varieties the Arinto, which they call *Bual* (our Reisling), the Terrantez, and D. Branca. The red kinds are far more abundant than the white; and the wine they make is red." The lagares (places in which the grapes are *trodden* and pressed) are rectangular tanks of ordinary masonry (and such are in common use in the province), mostly small, affording little accommodation, and seldom clean, not to say that they are often deplorably dirty. Formerly the vintage took place not before the 29th of September; there being usually made a proclamation of the time by authority. At the present time the vintage takes place earlier, and, as a consequence, the wine is, as they say, inferior to that made in former times. The better class of cultivators even still hold their vintage later, and succeed in making excellent wines."

The method followed in the making of wine, by the greater part of the cultivators, is the following:—

"As soon as the lagar is full of the *mixed* grapes, without any attempt at separating the dry, rotten, or green berries, all together is trodden out for wine, and plenty of men put on at once, so that the first part of the treading may be done in the shortest space of time; afterwards the work is carried on with fewer men during two days and the halves of two nights.

"When the fermentation has been well set up, they wait to ascertain how the wine offers to turn out. The fermentation is allowed to go on from two to eight days. The proof which is required is its having a vinous taste and smell, and a certain roughness of flavor on the palate. When it arrives at this point it is put into large casks, without any addition of brandy, until it is racked previous to being sold, and

even then only a small portion is added. The Senhor Campilho, one of the best vignerons in these parts, and whose wines are made with more than customary care, gives two almudes of brandy to every 700 gallons."

Remarks on Wines sent to the Exhibition, Melbourne, 1873.

It would be out of place now to trespass on the report of the wine experts, further than to add, that during the period that has elapsed since I had an opportunity of personally judging of any large collection of Victorian wines (1867), there is the most unmistakable evidence of vast improvement in nearly all their vinous properties. Most of our red wines then had, when young, a well-pronounced disagreeable earthy taste; but with more care, and improved methods of fermenting, and after-attention, that has in many instances disappeared. And, while our Victorian wines will have a character of their own, it is now certain that it will be a pleasant one. Young wines, from new vineyards on the valley of the Murray, were quite clean on the palate—in one instance remarkably so. From a vineyard near Echuca there came, in 1866, two lots of white and red wine, so offensive from this earthy taste, that the experts could find no terms strong enough to characterize it. In the instance of the reds, after four years they became good, but the whites, some of which remain, are still simply execrable. Yet a German vigneron, Mr. Vettler, has shown that, by care and attention, all these bad qualities can be avoided. None of his wines were more than two years old, yet the number of medals awarded him by experts, who had not the remotest knowledge whose wines they were judging, shows his complete success in wine-making.

I often hear persons interested in wine talking about foreign markets for their produce; but it has always seemed to me that our own people form the best customers of our produce. One thing is certain, that we are gradually and steadily becoming a wine-drinking people. The city is well spotted over with shops that deal in little else than colonial wine, which they retail at 2d. a large glass and 6d. a bottle! Now I have had many years experience of wine, as taken by the Portuguese, and I am bold to say that such wine as is retailed in Melbourne at 6d. per bottle cannot be had for twice the money in either Lisbon or Paris at this day.

In the absence of any official information, I take the following from the *Argus* of 15th February 1873:—"The decrease in the import of wines from £213,852 in 1862, to £64,766 in 1871, is clearly to be traced to the manufacture of wines, forced upon us by the extension of our

vineyards and to *a change in the drinking habits and tastes of our people.* Our import of wines of all kinds, in 1871, was 188,150 gallons, against 629,219 gallons of colonial manufacture, which increased to 713,589 gallons in 1872." The italics are mine, and I am delighted at seeing these statistics. They are all in favor of health and sobriety. What is now to be desiderated is the utter expulsion of bad brandy and worse "square gin," and one or two other "evil spirits," which, let us hope, time will soon effect, and substitute in their place both a taste for, and the needful supply of, wine brandy. Wine brandy does not ordinarily create any craving for it, but all this raw manufactured stuff does.

In an essay read before the Royal Society of Victoria, in 1867, I said:—"Experience has long ago convinced me that pledges and resolutions to abstain from ardent spirits are but 'poor safeguards of unstable virtue;' and that, to effect a lasting cure, the natural instincts must be not violently assaulted with resolves, but steadily and gently turned towards sources of reasonable and healthy gratification, while the danger of excess is effectually removed."

Am I wrong in thinking now that our pure native wines are doing their share in effecting a change in the *drinking habits and tastes of our people?*

The following is a list of a portion of the Victorian wines, sent to the Exhibition just closed in Melbourne, and left with me for further study and report, which have been already distilled, and their spirit strength, according to Sykes' tables, determined by me. They have been drawn from the representative wine districts of Victoria, viz.:—North of the dividing range is represented by August Heine and Bruhn Brothers; Castlemaine, by Mellon; the Loddon River, by William Botton; Sunbury, by Hon. J. G. Francis; Yering, by Hubert de Castella; Melbourne district, by Charles Maplestone and John Davis; Geelong wine districts, by the Hon. Dr. Hope and Mr. Jacob Weber; and the high country about Daylesford, by M. Jean Merle.

The necessity of having this essay printed in time for the Official Report of the Exhibition Commission prevented me from carrying on my inquiry further into the character of the wines sent to the Exhibition; but I trust to be able to continue it, and to publish my results in a paper for the next volume of the Acclimatization Society's Transactions. Meanwhile I will just add that they show, as a whole, great progress in the arts of making and treating wine.

If the Victorian vignerons will make their wines carefully, and sell them cheap, they will clear out all but the very best from year to year, and have no need to look for exorbitant prices in foreign markets.

GOVERNMENT STATISTICS OF ACREAGE UNDER VINES, AND ITS GRADUAL INCREASE FROM 1863 TO MARCH 1872.

Year ending 31st March.	Vines.	Year ending 31st March.	Vines.
	Acres.		Acres.
1863	2,006¾	1868	4,340
1864	3,076	1869	4,046
1865	3,594	1870	4,950
1866	4,078	1871	5,466
1867	4,111	1872	5,523

RETURN OF VINES GROWN AND WINE AND BRANDY MANUFACTURED IN THE COLONY OF VICTORIA FOR THE YEAR ENDING 31ST MARCH 1872.

County.	Number of Vines.	Grapes Gathered.		Wine Produced.	Brandy Manufactured.
		Not Made into Wine.	Made into Wine.		
		cwt.	cwt.	galls.	galls.
Anglesey	10,450	150	...	...	...
Benambra	8,700	68	106	460	...
Bendigo	821,095	7,083	9,508	58,234	...
Bogong	1,504,286	898	26,786	172,198	...
Boruck	317,933	1,787	2,813	17,410	...
Bourke	1,560,570	9,293	9,923	65,784	...
Buln-buln	12,330	17	99	675	...
Croajingolong ...	...	...	...	...	...
Dalhousie	59,710	247	385	2,206	...
Dargo	...	...	...	...	...
Delatite	127,215	259	2,911	19,448	...
Dundas	12,435	326	47	230	...
Evelyn	777,000	125	10,741	78,515	1,500
Follett	...	...	...	...	...
Gladstone	226,307	1,756	3,076	17,271	...
Grant	2,423,811	2,464	15,461	108,233	79
Grenville	40,167	202	722	4,323	...
Gunbower	4,000	...	35	200	...
Hampden	1,208	6	...	...	...
Heytesbury... ...	...	...	...	...	...
Kara-kara	60,350	413	251	1,829	...
Karkarook	...	...	...	...	...
Lowan	...	...	...	...	...
Millewa	...	...	...	...	...
Moira	572,650	312	8,872	66,980	...
Mornington ...	73,530	243	673	5,260	...
Normanby	19,875	239	90	430	...
Polwarth	33,000	460	650	3,000	...
Ripon	57,410	319	547	3,780	...
Rodney	222,746	205	2,508	17,420	...
Talbot	688,376	4,458	10,242	68,383	...
Tambo	...	...	...	...	...
Tanjil	2,588	17	...	...	...
Tatchera	6,000	60	...	...	...
Villiers	44,550	89	345	1,340	...
Weeah	...	...	...	...	...
Wonnangatta ...	3,000	...	...	...	...
Total ...	9,691,292	30,896	103,791	713,609	1,579

According to those tables the number of acres under vines has been substantially trebled in nine years—from 1863 to 1872. Yet this is hardly in keeping with the history of most of our new or localized industries. The rule is that we look on and say nothing until an industry has got well into the experimental scale, and then we rush madly into it. For many a year prior to 1866, a few colonial breweries struggled on, and their beer was tolerated by a small portion of the people; by some because it was cheap, by the patriotic because it was native produce; but it was generally decried and detested. But in 1866–7, at the Intercolonial Exhibition, it was brought into really public notice; and the dissertation upon it by Mr. Foord, and the medals awarded by the jurors to Carlton and Castlemaine ale, and one or two others, awoke in no small degree the attention of the public; and forthwith came the "rush" of brewers, and, as a result, the practical expulsion of the European article. It is so with woollen cloth making, and generally with other industries in Victoria; they struggle hard and finally flourish.

But there have been, and still exist, heavy obstacles in the way of the wine interest. Firstly, we are not, as a people, wine-drinkers as yet; else we should consume the produce of the colony in less than a month. Secondly, every vigneron has a pet idea of his own that his little patch of vines is the real Australian "*Cote d'Or,*" and his wine must soon bring a guinea a bottle. Thirdly, we want two or three merchants of large means, or two or three companies of not more than four or five partners, with ready cash to the amount of (say) £50,000, and suitable cellars not far from the city, and if possible on the river, who would buy anything, even the *worst* at its brandy value, and the better sorts at higher prices. Thus every grower of a hogshead or a pipe of wine could bring it in, have it tested, and obtain at once, in cash, its fair value, as he could for a load of wheat or oats. Such companies would soon supply the whole of the retail shops, and from the quantities in their cellars something like a uniform article might be supplied. Fourthly, in the instance of the more wealthy owners of vineyards, while their stock of middling wines would be kept down by selling to the companies, their experiments on their better growths would be carried on with more care and less anxiety about money matters. And lastly, the banks would be brought to the ordinary common sense of banks in Portugal, and make advances on wine in the cellar, on the report of competent judges, just as they now do on gold or station produce.

I have caused the following samples of Victorian wines to be distilled, and have determined their spirit strength according to Sykes' (British proof) strength.

Victorian Distilled Wines.

Name of Maker.	Name of Wine.	Vintage.	Color.	Proof Spirit.	Average.
August Heine ...	Reisling ...	1869	...	20·0	Sandhurst, 20·26
„ ...	Hermitage ...	1869	...	22·0	
„ ...	Mataro ...	1868	...	18·1	
Bruhn Brothers ...	Carbinet Sauvignon	1869	...	23·3	Sandhurst, 23·92
„ ...	Carbinet ...	1869	...	21·8	
„ ...	Reisling ...	1869	...	23·0	
„ ...	Verdeilho ...	1870	...	25·3	
„ ...	„ ...	1869	...	26·2	
F. Mellon	Muscat ...	1870	...	20·2	20·2
„	Pineau	1870	...	23·10	
„	Esparte (Mataro)	1870	...	17·4	
„	Pineau ...	1871	...	20·1	
H. de Castella ...	Chasselas ...	1869	...	22·10	Yering, 22·1
„ ...	Hermitage ...	1871	...	21·2	
Chas. Maplestone ...	Large and small Reisling	1868	...	20·6	Ivanhoe, 20·5
„ ...	„ „	1870	...	20·4	
Hon. J. G. Francis ...	Chasselas ...	1869	...	20·8	Sunbury, 22·3
„ ...	Gouais ...	1869	...	23·8	
Franz Schmidt ...	Reisling ...	1868	...	22·0	Berwick, 24·03
„ ...	„ ...	1869	...	23·8	
„ ...	„ ...	1866	...	26·3	
John Davis ...	Ngarveno (White)	...	...	18·6	Ngarveno, 20·4
„ ...	„ (Red)	...	...	22·2	
Jacob Weber ...	Hermitage ...	1871	...	20·0	22·75
„ ...	Chasselas ...	1871	...	25·5	
Hon. R. C. Hope, Geelong	Hermitage ...	1870	...	24·4	23·98
„ „	Second sample ...	1870	...	22·6	
„ „	Gouais and Reisling	1871	...	25·1	
„ „	Reisling ...	1871	...	24·4	
„ „	Hermitage ...	1871	...	23·4	

VICTORIAN DISTILLED WINES—*continued.*

Name of Maker.	Name of Wine.	Vintage.	Color.	Proof Spirit.	Average.
Jean Merle, Daylesford	Gamais ...	1871	...	19·8	18·7
„ „	„ ...	1870	...	16·2	
„ „	Another bottle do.	1870	...	19·1	
„ „	Another sample...	1870	...	19·7	
Wm. Botten, Loddon ...	Shiraz	1868	...	24·4	23·0
„ „	White Hermitage	1871	...	22·6	
„ „	Shiraz	1869	...	22·0	
August Mueller ...	Muscatel ...	...	...	23·2	23·4
„ ...	Shiraz ...	...	...	22·0	
„ ...	Verdeilho ...	...	...	25·0	
Hon. J. G. Francis ...	Mataro ...	1869	...	16·2	22·3
„ ...	Hermitage ...	1866	...	22·0	
„ ...	„ ...	1867	...	22·0	
„ ...	Verdeilho ...	1868	...	24·4	
Otto Jung	Rousette ...	1871	White	21·8	23·05
„	Hermitage ...	1871	Red	24·3	
Carl Pohl (857) ...	Mataro, Hermitage, and Pineau	1871	Red	21·8	23·7
„ (855) ...	Verdeilho ...	1872	White	24·9	
„ (861) ...	Carbinet and Hermitage	1869	Red	22·6	
„ ...	Verdeilho ...	1871	White	25·5	
J. S. Johnston, Sunbury	Reisling ...	1869	White	20·0	20·9
„ „	Verdeilho, a little mixed	1869	White	21·8	
Messrs. Docker, Bontherambo	Reisling ...	1869	White	19·8	22·1
„ „	Hermitage ...	1869	Red	22·4	
Fred. Egli	Hermitage ...	1872	Red	21·8	21·8
John Vettler, Echuca...	Gouais ...	1871	White	23·2	22·46
„ „	Sherry ...	1871	White	20·0	
„ „	W. Morillion ...	1871	White	22·4	
„ „	Gloria Australiæ	1871	Red	24·9	
„ „	Mataro ...	1871	Red	21·8	

VICTORIAN DISTILLED WINES—*continued.*

Name of Maker.	Name of Wine.	Vintage.	Color.	Proof Spirit.	Average.
Joseph Best	Burgundy and Black Pineau	1871	Red	22·4	23·0
„ ...	Muscatel, Chasselas, and Tokay	1871	White	23·6	
Jacob Deppeler ...	Hermitage ...	1870	Red	23·6	23·0
„ ...	Reisling ...	1870	White	22·4	
Wm. McDonald ...	B. Muscat ...	1867	Brown	32·2	
Trouetti	Reisling ...	1870	White	20·4	18·95
„	Black Cluster ...	1871	Red	17·5	
Cowan Paton ...	Reisling ...	1870	White	21·6	20·55
„ ...	Shiraz ...	1870	Red	19·5	
Robinson	Burgundy ...	1871	Red	21·6	
T. Creppa	Burgundy ..	1871	Red	16·2	17·35
„	Hermitage ...	1871	Red	18·5	
Seidd	Muscat ...	1871	...	21·0	22·48
„	Pedro Ximenes ...	1871	White	22·6	
„	Verdeilho ...	1871	White	23·8	

I conclude, then, as I began, saying that, hopeful as our colonial wine industry is, it is not as yet quite out of its nonage.

NOTE.

For the guidance of persons testing the spirit strength of liquids the following will be useful, as there were until within the last two years hardly any other than Gay-Lussac's tables to be had, with Saleron's small stills. Lately, hydrometers and tables calculated on what is known as "Sykes'," or English proof spirit, have been procurable :—

COMPARATIVE VALUE OF FRENCH AND ENGLISH DEGREES OF ALCOHOLIC STRENGTH.

The different modes of expressing the strength of liquors adopted in England and France is the source of much inconvenience and confusion. In both countries the operation of testing or trying the strength is by distillation of a determi-

nate quantity, and then taking the temperature and density of the distillate by thermometers and hydrometer, but here the similarity ends. The instruments as used in the two countries differ essentially, and therefore the results are shown in different terms. In England, Fahrenheit's thermometer and Sykes' hydrometer are used; in France, the centigrade thermometer and Gay-Lussac's hydrometer. These thermometers differ in the fact that the range between the temperature of frozen and boiling water is divided in the latter (centigrade) into 100 parts or degrees, and in the former into 180. Gay-Lussac's hydrometer is graduated to show 100 divisions or degrees between absolute alcohol of ·796 specific gravity, at 15·5 Centigrade or 60° Fahrenheit, and pure water; while the scale of Sykes' hydrometer starts from a definite mixture of water and pure alcohol, nearly in equal volumes, having a specific gravity of ·920 at 60° Fahrenheit, and called proof spirit, and the instrument shows whether the spirit under test is of greater or less strength than such proof. In various scientific works tables are given of the equivalent degrees of these two scales, but none of them exactly correspond. The following figures are very nearly exact :—

Sykes.	Gay-Lussac.	Sykes.	Gay-Lussac.	Sykes.	Gay-Lussac.
1	0·5	9·5	6·5	21·5	13
2	1	11	7	23	14
3	2	13	8	24	15
4	3	15	9	25	16
4·5	3·5	16·5	9·75	26·5	17
5	4	18	10·5	28	18
6·5	5	19	11·5	30	19
8	6	20	12	32	20

Under the excise laws of France, wine generally is not allowed to be fortified for home consumption; but, under certain limitations, spirit to the extent of 5 per cent. may be added to the produce of the eastern Pyrenees, the Aude, the Tarn, the Hérault, the Gard, and the Rhône. All wines for exportation may be fortified without restriction, and most vintages are so strengthened before being shipped—Roussillon wines for Brazil to the extent of 10 per cent., and for England from 5 to 8 per cent.

EXHIBITS OF WINES.—LONDON INTERNATIONAL

No. as per Catalogue.	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.	Color.	Character of Wine.
						ARARAT
702	Joseph Best ..	Great Western	Muscat, Chasselas, and Tokay	Sauterne ..	White..	Light and dry
703	Ditto	Ditto ..	Burgundy and Black Pineau	Burgundy ..	Red ..	Light ..
704	Ditto	Ditto ..	White Hermitage, Chasselas, and Reisling	Hock ..	White..	Light and dry
705	Ditto	Ditto ..	Hermitage and Frontignac	Claret ..	Red ..	Light ..
706	Trouette and Blampied	Ditto ..	Black Cluster ..	Burgundy ..	Red ..	Full-bodied ..
707	Ditto	Ditto ..	Mixed Grapes ..	Claret ..	Red ..	Light ..
708	Ditto	Ditto ..	Reisling	Reisling ..	White..	Full-bodied ..
709	Ditto	Ditto ..	Chasselas ..	Chasselas ..	White..	Light ..
						BEECHWORTH
710	F. G. and J. B. Docker	Wangaratta ..	Four-fifths Shiraz, one-fifth Malbec	Shiraz ..	Red ..	Medium ..
711	Ditto	Ditto ..	Reisling	Reisling ..	White..	Medium ..
712	Ditto	Ditto ..	Shiraz	Shiraz ..	Red ..	Full-bodied ..
713	Henry Evans ..	Beechworth ..	Ditto	Ditto ..	Red ..	Full-bodied ..
714	Ditto	Ditto ..	Reisling, Tokay, Verdeilho, and Pedro Ximenes	Bogong Wine	White..	Full-bodied ..
715	William McDonald	North Wangaratta	Mataro, Grenache, and Carrignan	Roussillion ..	Red ..	Full-bodied and sweet
716	Ditto	Ditto ..	Brown Muscat ..	Muscatel ..	Brown	Full-bodied and sweet
718	Cowan D. Paton	Three-mileCreek	Reisling	Reisling ..	White..	Light ..
719	Ditto	Ditto ..	Burgundy ..	Burgundy ..	Puise ..	Light ..
720	Ditto	Ditto ..	Shiraz	Shiraz ..	Red ..	Full-bodied ..
721	Curtis Alexr. Reid	Tarrawingee ..	Reisling	Reisling ..	White..	Full-bodied dry
722	Ditto	Ditto ..	Tinta	Tinta ..	Red ..	Full-bodied dry
723	George Spink ..	Ditto ..	Reisling	Reisling ..	White..	Full-bodied ..
724	James Webster..	Beechworth ..	Verdeilho ..	Verdeilho ..	White..	Full-bodied dry
						CASTLEMAINE
725	William Botten	Loddon River	Shiraz	Hermitage ..	Red ..	Full-bodied ..
726	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Full-bodied ..
727	Ditto	Ditto ..	White Hermitage..	WhiteHermitage	White..	Light ..
728	Fabrizia Crippa	Hepburn ..	Burgundy ..	Burgundy ..	Red ..	Full-bodied ..
729	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Light ..
730	Otto Jung ..	Chinaman's Creek	Ditto	Ditto ..	Red ..	Full-bodied ..
731	Ditto	Ditto ..	Cluster and Frontignac	Cluster and Frontignac	Red ..	Medium ..
732	Ditto	Ditto ..	Rousette ..	Rousette ..	White..	Full-bodied ..
733	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
734	Francais Mellon	Dunolly ..	.. .. ..	Muscat ..	Red ..	.. ..
735	Ditto	Ditto ..	.. .. ..	Pineau ..	Red ..	.. ..
736	Ditto	Ditto ..	.. .. ..	Ditto ..	Red ..	.. ..
737	Ditto	Ditto ..	.. .. ..	Esparte ..	Red ..	.. ..
738	Thomas Meredith	Chewton ..	Shepherd's Reisling	Reisling ..	White..	Light ..
739	Ditto	Ditto ..	Mataro, Grenache, and Carrignan	Chewtonia ..	Red ..	Light ..
740	Ditto	Ditto ..	Hermitage, Carrignan, and Black Cluster	Burgundy ..	Red ..	Full-bodied ..

EXHIBITION OF 1873—VICTORIAN EXHIBITION OF 1872.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Selling Price per Gallon at the Vineyard.	Proof Spirit.
	Years.					
DISTRICT.						
1871	5	Sand, gravel, and clay	By plough	Stakes	No sales	23·6
1871	5	Ditto	Ditto	Ditto	Ditto	22·4
1871	5	Ditto	Ditto	Ditto	Ditto	..
1870	5	Ditto	Ditto	Ditto	Ditto	..
1871	8	Sand and clay	Ditto	Ditto	15s.	17·5
1871	8	Ditto	Ditto	Ditto	12s.	..
1870	8	Ditto	Ditto	Ditto	12s.	20·4
1870	8	Ditto	Ditto	Ditto	10s.	..
DISTRICT.						
1867	3	Red loam on a large natural plain	Plough	Stakes	2s.	..
1869	6	Ditto	Ditto	Ditto	2s.	19·8
1870	7	Ditto	Ditto	Ditto	2s.	22·4
1871	4 to 10	Chocolate clay mixed with sandstone and quartz	Trenched	Ditto	10s.	..
1871	4 to 10	Ditto	Ditto	Ditto	10s.	..
1866	5	Red sandy loam	By hand	Low trellis	10s.	..
1867	5	Ditto	Ditto	Ditto	12s.	32·2
1870	6	Light chocolate soil	Trenched	Stakes	2s.	21·6
1870	6	Ditto	Ditto	Ditto	2s.	..
1870	6	Ditto	Ditto	Ditto	2s.	19·5
1870	13	Red loam with iron and small mixture of lime	Plough and horse-hoe	Ditto	8s.	23·2
1870	9	Ditto	Ditto	Ditto	6s.	24·4
1871	8	Sandy	Plough	Ditto	5s.	23·8
1871	5	Silurian, rich red	By hand	Ditto	4s.	23·6
DISTRICT.						
1869	10	Sandy loam	Plough	Stakes	9s.	22·0
1868	10	Ditto	Ditto	Ditto	10s.	24·4
1871	10	Ditto	Ditto	Ditto	7s.	22·6
1872	10	Chocolate soil	Horse-hoe	Ditto	5s.	16·2
1871	9	Ditto	Ditto	Ditto	4s.	18·5
1871	10	Red clay and slate	Trenched by hand	Stakes, 4 x 4 ft.	7s.	24·3
1871	10	Ditto	Ditto	Ditto	7s.	..
1871	10	Ditto	Ditto	Ditto	8s.	21·8
1869	10	Ditto	Ditto	Ditto	8s.	..
1870	..	..	..	..	..	20·2
1870	..	..	..	..	..	23·10
1871	..	..	..	..	..	20·1
1870	..	..	..	..	..	17·4
1869	11	Clay	By hand	Trellis and stakes	6s.	22·0
1867	9	Clay, slate, and sandstone	Ditto	Ditto	6s.	..
1867	9	Ditto	Ditto	Ditto	8s.	..

EXHIBITS OF WINE.—LONDON INTERNATIONAL EXHIBITION

No. as per Catalogue.	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.	Color.	Character of Wine.
						CASTLEMAINE
741	Thomas Meredith	Chewton ..	Tokay	Tokay ..	White..	Full-bodied ..
742	Ditto	Ditto ..	Ditto	Ditto ..	White..	Full-bodied ..
743	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
744	Ehrenfield Schroeder	Chinaman's Creek	Hermitage and Carbinet	Red Imperial	Red ..	Full-bodied ..
745	Ditto	Ditto ..	Mataro	Mataro ..	Red ..	Medium ..
746	Ditto	Ditto ..	Chasselas ..	Chasselas ..	White..	Full-bodied ..
747	Ditto	Ditto ..	Reisling	Reisling ..	White..	Full-bodied ..
						ECHUCA
748	John Vettler ..	Echuca ..	White Morrillon ..	Yambuna ..	White..	Light ..
749	Ditto	Ditto ..	Verdeilho ..	Verdeilho ..	White..	Full-bodied ..
750	Ditto	Ditto ..	Miller's Burgundy	Burgundy ..	Red ..	Full-bodied ..
751	Ditto	Ditto ..	Gouais	Gouais	White..	Light ..
752	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
753	Ditto	Ditto ..	Gloria of Australia	Leverdun ..	Red ..	Full-bodied ..
754	Ditto	Ditto ..	Miller's Burgundy	Burgundy ..	Red ..	Full-bodied ..
755	Ditto	Ditto ..	Mataro	Mataro ..	Red ..	Light ..
756	Ditto	Ditto ..	Sherry	Trebiano ..	White..	Light ..
757	Ditto	Ditto ..	Carbinet Sauvignon	Carbinet ..	Red ..	Full-bodied ..
758	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
759	Ditto	Ditto ..	Grenache ..	Grenache ..	Red ..	Full-bodied ..
760	Ditto	Ditto ..	Reisling	Reisling ..	White..	Light ..
761	Ditto	Ditto ..	Sherry	Trebiano ..	Amber	Full-bodied ..
						GEELONG
762	Jacob Deppeler	Gheringhap ..	Reisling	Reisling ..	White..	Light ..
763	Ditto	Ditto ..	Hermitage and Burgundy	Miller's Burgundy	Dark ..	Light ..
764	Ditto	Ditto ..	White Hermitage	White Hermitage	White..	Full-bodied ..
765	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Dark ..	Full-bodied ..
766	R. C. Hope ..	Lymburn ..	Ditto	Ditto ..	Red ..	Light ..
767	Ditto	Ditto ..	Reisling and Gouais	Reisling ..	White..	Light ..
768	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Light ..
769	Ditto	Batesford ..	Reisling and Gouais	Reisling ..	White..	.. ..
770	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	.. ..
771	Jacob Weber ..	Leigh Road ..	Ditto	Ditto ..	Red ..	Full-bodied ..
772	Ditto	Ditto ..	Chasselas ..	Chasselas ..	White..	Full-bodied ..
						GOULBURN
773	Edwd. L. Robinson	Goulburn Valley	Burgundy and Hermitage	Burgundy ..	Red ..	Medium ..
774	F. B. Seidd (for Proprietors)	Tabilk vineyard, Seymour	Malbec	Malbec ..	Red ..	Light claret ..
775	Ditto	Ditto ..	Pedro Ximenes ..	Pedro Ximenes	White..	Medium ..
776	Ditto	Ditto ..	Reisling	Reisling ..	White..	Full-bodied ..
777	Ditto	Ditto ..	Verdeilho ..	Verdeilho ..	White..	Full-bodied and sweet
778	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
779	Ditto	Ditto ..	Muscat	Muscat ..	Pink ..	Full-bodied and sweet
780	Ditto	Ditto ..	Carbinet Sauvignon	Carbinet Sauvignon	Red ..	Full-bodied ..
781	Frederick Egli ..	Tabilk ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..

OF 1873—VICTORIAN EXHIBITION OF 1872—*continued.*

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Selling Price per Gallon at the Vineyard.	Proof Spirit.
	Years.					
DISTRICT—*continued.*						
1868	8	Clay, slate, and sandstone	By hand	Trellis and stakes ..	8s.	..
1870	6	Ditto	Ditto	Ditto	6s.	..
1869	8	Ditto	Ditto	Ditto	8s.	24·4
1870	8	Slate, sandstone, and clay	Trenched by hand ..	Stakes, 4 x 4 ft. ..	7s. 6d.	22·0
1871	8	Ditto	Ditto	Ditto	5s.	..
1870	8	Ditto	Ditto	Ditto	8s.	..
1871	8	Ditto	Ditto	Ditto	7s.	..
DISTRICT.						
1871	6	Sandy soil	Planted 6 ft. x 6 ft.; pruned long rod and spur; ploughed and horse-hoed	Trained on two wires; stakes 30 ft. apart	3s.	22·4
1871	5	Ditto	Ditto	Ditto	5s.	..
1871	6	Ditto	Ditto	Ditto	3s.	..
1871	5	Ditto	Ditto	Ditto	3s.	23·2
1869	4	Ditto	Ditto	Ditto	12s.	..
1871	5	Ditto	Ditto	Ditto	3s.	24·9
1870	5	Ditto	Ditto	Ditto	6s.	..
1871	5	Sand, clay, and loam	Ditto	Ditto	3s.	21·8
1871	5	Sandy soil	Ditto	Ditto	3s.	20·0
1871	5	Ditto	Ditto	Ditto	3s.	..
1870	5	Ditto	Ditto	Ditto	6s.	..
1870	4	Sand and clay ..	Ditto	Ditto	5s.	..
1871	5	Ditto	Ditto	Ditto	5s.	..
1870	4	Sandy soil	Ditto	Ditto	5s.	..
DISTRICT.						
1870	8	Sandy clay with limestone bottom	4 feet apart ..	Stakes	3s. 6d.	22·4
1872	8	Ditto	Ditto	Ditto	2s. 6d.	..
1872	8	Ditto	Ditto	Ditto	2s. 6d.	..
1870	8	Ditto	Ditto	Ditto	3s. 6d.	23·6
1871	9	Black	Plough	Ditto	4s.	23·4
1872	9	Sandy and gravelly	Ditto	Ditto	4s.	..
1872	9	Black	Ditto	Ditto	4s.	..
1871	10	Sandy loam and gravel	Ditto	Ditto	4s.	25·1
1870	10	Dark loamy soil ..	Ditto	Ditto	4s.	24·4
1872	15	Sandy loam, limestone bottom	Ditto	Ditto	5s.	20·0
1871	15	Ditto	Ditto	Ditto	4s.	25·5
DISTRICT.						
1871	4 to 8	Plain red soil ..	Horse and hand ..	Stakes	2s.	21·6
1872	9 to 10	Sandy loam, a decomposition of the old red sandstone	By hand and scarifier, working by hand in the rows; short pruning	Stakes, 4 ft. x 4 ft. ..	Not stated ..	..
1872	9 to 10	Ditto	Ditto	Ditto	Ditto ..	22·6
1872	9	Ditto	Ditto	Ditto	Ditto ..	..
1872	9	Ditto	Ditto	Ditto	Ditto ..	23·8
1872	9 to 10	Ditto	Ditto	Ditto	Ditto ..	..
1872	9 to 10	Ditto	Ditto	Ditto	Ditto ..	21·0
1872	9 to 10	Ditto	Ditto	Ditto	Ditto ..	..
1872	5	Red chocolate soil ..	By hand	Stakes	4s.	21·8

EXHIBITS OF WINE.—LONDON INTERNATIONAL EXHIBITION

No. as per Catalogue.	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.	Color.	Character of Wine.
						MELBOURNE
782	Thomas Barrett	Coburg ..	Hermitage ..	Shiraz ..	Dark ..	Full-bodied ..
783	Ditto	Ditto ..	Miller's Burgundy	Burgundy ..	Ruby ..	Full-bodied ..
784	Ditto	Ditto ..	Mixed	Malaga ..	White..	Sweet ..
785	Ditto	Ditto ..	Verdeilho ..	Verdeilho ..	White..	Light ..
786	Hubert de Castella	Yering ..	Chasselas ..	St. Hubert's Chasselas	White..	Light ..
787	Ditto	Ditto ..	Hermitage ..	Ditto Hermitage	Red ..	Light but rich
788	Ditto	Ditto ..	Sauvignon ..	Ditto Sauvignon	Red ..	Full-bodied ..
790	Walter Clark ..	Bulla ..	Blanc	Sherry ..	White..	Light ..
791	Ditto	Ditto ..	Verdeilho ..	Verdeilho ..	White..	.. ..
792	Ditto	Ditto ..	Reisling	Reisling ..	White..	Light ..
793	John Davies ..	Moonee Ponds	Various	Ngarvino ..	White..	Light ..
794	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Light ..
795	John Foy ..	Boroondara ..	Hermitage ..	Hermitage ..	Dark purple	Light ..
796	Ditto	Ditto ..	Burgundy ..	Burgundy ..	Red ..	Light ..
797	Ditto	Ditto ..	Tokay	Tokay ..	Straw ..	Light ..
798	James Goodall Francis	Sunbury ..	Chasselas ..	Chasselas ..	White ..	Light ..
799	Ditto	Ditto ..	Gouais	Gouais ..	White ..	Full-bodied ..
800	Ditto	Ditto ..	Verdeilho ..	Verdeilho ..	White ..	Full-bodied ..
801	Ditto	Ditto ..	Mataro	Mataro ..	Red ..	Light ..
802	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
803	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Full-bodied ..
804	J. S. Johnstone	Ditto ..	Verdeilho ..	Verdeilho ..	White ..	Full-bodied ..
805	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied dry
806	Ditto	Ditto ..	Mixed, principally Shepherd's Reisling	Reisling ..	White ..	Light ..
807	Charles Maplestone	Ivanhoe, Heidelberg	Large and small Reisling	White Ivanhoe	White (straw)	Light ..
808	Ditto	Ditto ..	Ditto	Ditto ..	White (straw)	Light ..
810	Ditto	Ditto ..	Hermitage ..	Red Ivanhoe	Red(ruby)	Light ..
811	Franz Schmitt ..	Berwick ..	Reisling	Reisling or Hock	White ..	Full-bodied ..
812	Ditto	Ditto ..	Ditto	Ditto ..	White ..	Full-bodied ..
813	Ditto	Ditto ..	Ditto	Ditto ..	White ..	Full-bodied ..
814	Jacob Schneider	Nunawading ..	Hermitage ..	Hermitage ..	Black ..	Light ..
815	Ditto	Ditto ..	Reisling	Reisling ..	White ..	Rather full ..
816	F. B. Seidel ..	Yan Yean ..	Mixed, chiefly Sweetwater and Pineau Blanc	Victorian White Wine	White ..	Dry .. ..
						MURRAY
817	James T. Fallon	Albury ..	Brown Muscat ..	Brown Muscat	Brown ..	Dry .. ..
818	Ditto	Ditto ..	Ditto	Ditto ..	Brown ..	Fruity ..
819	Ditto	Ditto ..	Shiraz	Shiraz ..	Dark ..	Medium dry ..
820	Ditto	Ditto ..	Carbinet ..	Carbinet ..	Dark ..	Fruity ..
821	Ditto	Ditto ..	Reisling	Reisling ..	White ..	Dry ..
822	Ditto	Ditto ..	Burgundy ..	Burgundy ..	Dark ..	Dry ..
823	Augustus Mueller	Yackandandah	Verdeilho and Madeira	Verdeilho ..	White ..	Dry and strong
824	Ditto	Ditto ..	Muscatel and Tokay	Muscatel ..	Light-brown	Full-bodied and sweet
825	Ditto	Ditto ..	Shiraz & Burgundy	Shiraz ..	Red ..	Full-bodied, slightly sweet
826	James Scott	Wahgunyah ..	Reisling ..	Reisling ..	Straw color	Dry ..
827	Geo. T. Smith ..	Ditto ..	Muscatel ..	Constantia ..	Red ..	Sweet ..
828	Ditto	Ditto ..	Muscatel and Shiraz	Port ..	Red ..	Sweet ..
829	Ditto	Ditto ..	Shiraz	Claret ..	Red ..	Light and dry
830	Ditto	Ditto ..	Ditto	Burgundy ..	Red ..	Light and dry
831	Ditto	Ditto ..	Ditto	Reisling ..	White ..	Light and dry

OF 1873.—VICTORIAN EXHIBITION OF 1872—*continued.*

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Selling Price per Gallon at the Vineyard	Proof Spirit.
	Years.					
DISTRICT.						
1867	15	Black soil	By hand	Wire trellis ..	8s.	..
1867	20	Ditto .. .	Ditto	Ditto	7s.	..
1867	10	Ditto	Ditto	Ditto	9s.	..
1867	20	Ditto	Ditto	Ditto	9s.	..
1869	7	Rich loam, clay subsoil	.. .. ..	Stakes, 5 ft. x 3 ft. ..	3s.	22·10
1869	7	Ditto	.. .. ..	Ditto	3s.	21·2
1871	6	Ditto	.. .. ..	Ditto	5s.	..
1870	10	Loamy	.. .. ..	Stakes	5s.	19·7
1871	7	Slightly volcanic ..	.. .. ..	Trellis	6s.	..
1871	7	Ditto	.. .. ..	Stakes	5s.	..
1869	9	Gravelly and volcanic	Plough and scarifier	Trellis, 3 wires ..	7s.	18·6
1869	9	Ditto	Ditto	Ditto	5s.	22·2
1870	9	Loam and gravel with clay bottom	Trenched	Stakes, 4 ft. x 4 ft. 6 in.	6s.	23·0
1868	9	Ditto	Ditto	Ditto	5s. 6d.	..
1869	9	Ditto	Ditto	Ditto	6s.	..
1869	7	Great variety of soil	Plough and hand-hoe	Part trellised, part trained to stakes	3s. to 6s.	20·8
1869	7	Ditto	Ditto	Ditto	3s. to 6s.	23·8
1868	7	Ditto	Ditto	Ditto	3s. to 6s.	24·4
1869	7	Ditto	Ditto	Ditto	3s. to 6s.	16·2
1867	7	Ditto	Ditto	Ditto	3s. to 6s.	22·0
1866	7	Ditto	Ditto	Ditto	3s. to 6s.	22·0
1869	5	Rich friable chocolate, clay subsoil	Plough and horse-hoe	Trellis	8s.	21·8
1869	5	Ditto	Ditto	Ditto	5s.	..
1869	5	Ditto	Ditto	Ditto	5s.	20·0
1868	12	Sandy loam ..	Plough, harrow, scarifier, spade, and hoe	Trellis, 3 wires ..	15s.	20·6
1869	12	Ditto	Ditto	Ditto	15s.	20·4
1870	12	Ditto	Ditto	Ditto	10s. 6d.	..
1868	8	Stiff black clay ..	By hand	Stakes, trellis fashion	15s.	22·0
1869	9	Ditto	Ditto	Ditto	15s.	23·8
1866	6	Ditto	Ditto	Ditto	20s.	26·3
1870	9	Marly	Ditto	Stakes	5s.	..
1869	9	Ditto	Ditto	Ditto	5s.	..
1847or 1848	5 or 6	Strong loamy soil ..	Ditto	Staked and trellised	..	27·0
DISTRICT.						
1864	14	Red chocolate soil ..	Plough and scarifier	Stakes	Not stated ..	..
1869	14	Ditto	Ditto	Ditto	Ditto ..	..
1864	14	Ditto	Ditto	Ditto	Ditto ..	..
1867	14	Ditto	Ditto	Ditto	Ditto ..	..
1862	14	Ditto	Ditto	Ditto	Ditto ..	..
1867	14	Ditto	Ditto	Ditto	Ditto ..	..
1870	7	Rich but shallow chocolate over slate rock	By hand	Stakes, 4 x 4 feet ..	9s. ..	25·0
1870	7	Ditto	Ditto	Ditto	9s. ..	23·2
1870	7	Ditto	Ditto	Ditto	9s. ..	22.0
1869	8	Chocolate; friable calcarious	Plough	Stakes	8s. ..	..
1869	8	Light sandy soil ..	.. .. ..	Stakes, 6 x 6 feet ..	None sold ..	24·2
1869	8	Ditto	.. .. ..	Ditto	Ditto ..	..
1869	9	Ditto	.. .. ..	Ditto	Ditto ..	24·4
1869	9	Ditto	.. .. ..	Ditto	Ditto ..	..
1869	9	Ditto	.. .. ..	Ditto	Ditto ..	..

EXHIBITS OF WINE.—LONDON INTERNATIONAL EXHIBITION

No. as per Catalogue.	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.	Color.	Character of Wine.
						SANDHURST
832	Bruhn Brothers	Emu Creek ..	Reisling and Pineau Blanc	Hock ..	White ..	Light ..
833	Ditto	Ditto ..	Verdeilho ..	Verdeilho ..	White ..	Full-bodied ..
834	Ditto	Ditto ..	Pineau Blanc and Verdeilho	Pineau Blanc	White ..	Light ..
835	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Dark-red	Full-bodied and sweet
836	Ditto	Ditto ..	Carbinet Sauvignon	Carbinet ..	Dark-red	Full-bodied and sweet
837	Ditto	Ditto ..	Reisling ..	Reisling ..	White ..	Light ..
838	Hans K. Fick ..	Campaspe ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
839	Ditto	Ditto ..	Mataro	Mataro ..	Red ..	Full-bodied ..
840	Ditto	Ditto ..	Chasselas ..	Chasselas ..	White ..	Light ..
841	George Wm. Geyer	St. Arnaud ..	.. .. ..	Claret ..	..	.. ..
842	Frederick Grosse	Strathfieldsaye	Carbinet Sauvignon	Carbinet ..	Red ..	Light ..
843	August Heine ..	Sheepwash ..	Reisling	Reisling ..	White ..	Light ..
844	Ditto	Ditto ..	Hermitage ..	Shiraz or Hermitage	Red ..	Full-bodied ..
845	Ditto	Ditto ..	Mataro	Mataro ..	Red ..	Light ..
846	Ditto	Ditto ..	Reisling	Reisling ..	White ..	Full-bodied ..
847	Heine and Greiffenhagen	Strathfieldsaye	Verdeilho ..	Verdeilho ..	White ..	Full-bodied ..
848	Ditto	Ditto ..	Reisling	Reisling ..	White ..	Light ..
849	Ditto	Ditto ..	Chasselas ..	Chasselas ..	White ..	Light ..
850	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
851	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Full-bodied ..
852	Ditto	Ditto ..	Carbinet Sauvignon	Carbinet Sauvignon	Red ..	Full-bodied ..
853	Ditto	Ditto ..	Mataro	Mataro ..	Red ..	Light ....
854	Fred. C. Klemm	Emu Creek ..	Carbinet Sauvignon	Carbinet Sauvignon	Red ..	Full-bodied, dry, character of Burgundy
855	Carl Pohl ..	Emu Creek, Strathfieldsaye	Verdeilho ..	Verdeilho ..	White ..	Full-bodied ..
856	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
857	Ditto	Ditto ..	Mataro, Hermitage, and Pineau Blanc	.. ..	Red ..	Light ..
858	Ditto	Ditto ..	Verdeilho ..	Verdeilho ..	White	Full-bodied ..
859	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
860	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Full-bodied ..
861	Ditto	Ditto ..	Carbinet and Hermitage	Carbinet and Hermitage	Red ..	Full-bodied ..
862	Ditto	Ditto ..	Hermitage ..	Hermitage ..	Red ..	Full-bodied ..
863	Frederick King, Shaw	Goornong ..	Ditto	Ditto ..	Red ..	Full-bodied ..
864	Ditto	Ditto ..	White Nice, or Victorian Sweetwater	Victoria ..	White	Full-bodied ..
865	Jean Merle ..	Daylesford ..	Gamais	Gamais ..	Red ..	Light ..
866	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Full-bodied ..
867	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Full-bodied ..
868	Ditto	Ditto ..	Ditto	Ditto ..	Red ..	Full-bodied ..

N.B.—Average spirit strength of 88 samples distilled and recorded above,

OF 1873.—VICTORIAN EXHIBITION OF 1872—*continued.*

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Selling Price per Gallon at the Vineyard.	Proof Spirit.
	Years.					
DISTRICT.						
1866	11	Sandy soil	By hand	Stakes	15s.	..
1870	9	Red clay	Plough and horse-hoe	Ditto	15s.	25·3
1870	9	Ditto	Ditto	Ditto	12s. 6d.	..
1869	12	Ditto	Ditto	Ditto	15s.	22·7
1869	12	Ditto	Ditto	Ditto	15s.	23·3
1869	11	Ditto	By hand	Ditto	15s.	23·0
1871	15	Loam, clay subsoil ..	Ditto	Ditto	8s.	..
1871	15	Ditto	Ditto	Ditto	7s.	..
1871	15	Ditto	Ditto	Ditto	6s.	..
1872	..	.. .. ..	.. .. ..	.. .. ..	..	..
1870	7	Light loamy, gravelly, red clay subsoil, resting on shale and slate	.. .. ..	Stakes, 5 ft. x 5 ft. ..	..	..
1868	13	Black soil	Plough	Stakes	5s.	..
1869	7	Red loam	Ditto	Ditto	10s.	22·7
1868	12	Ditto	Ditto	Ditto	5s.	18·1
1869	10	Ditto	Ditto	Ditto	5s.	20·0
1869	5	Sandy loam, red clay subsoil	Trenched	Ditto	15s.	..
1871	5	Ditto	Ditto	Ditto	7s.	..
1871	5	Ditto	Ditto	Ditto	5s.	22·0
1869	7	Ditto	Ditto	Ditto	12s.	..
1871	9	Ditto	Ditto	Ditto	10s.	24·4
1869	8	Ditto	Ditto	Ditto	12s.	..
1871	6	Ditto	Ditto	Ditto	6s.	..
1868	6	Red clay, rich subsoil, near a creek	Trenched and manured	Ditto	6s., when one year old	..
1872	6	Red clay	Plough	Ditto	15s., when one year old	24·9
1872	9	Ditto	Ditto	Ditto	15s., ditto ..	..
1871	8	Ditto	Ditto	Ditto	12s. 6d.	21·8
1871	4	Ditto	Ditto	Ditto	15s.	25·5
1869	6	Ditto	Ditto	Ditto	15s.	..
1871	6	Ditto	Ditto	Ditto	15s.	..
1869	6	Ditto	Ditto	Ditto	15s.	22·6
1869	6	Ditto	Ditto	Ditto	15s.	24·2
1869	10	Chocolate soil ..	Plough and scarifier	Ditto	8s.	..
1869	12	Ditto	Ditto	Ditto	5s.	..
1871	5 to 14	Ditto	Horse-hoe	Ditto	3s.	19·8
1870	5 to 14	Ditto	Ditto	Ditto	5s.	16·2
1870	5 to 14	Ditto	Ditto	Ditto	5s.	19·1
1870	5 to 14	Ditto	Ditto	Ditto	3s.	19·7

of Victorian wines, 21·82 Sykes' proof spirit.—JOHN I. BLEASDALE.

Appendix A.

During the time the Royal Commission for "Foreign Industries and Forests in Victoria" was sitting, I obtained, through my college at Lisbon, as many as possible of the standard and most recent works on vineyards and wines. Had the above-mentioned Commission had full scope to accomplish in a satisfactory manner the objects proposed to it, either the whole or extensive extracts from these works would have been in the hands of our vignerons nearly two years ago. And now that the work originally allotted to the Commission forms part of the objects embraced by the Department of Agriculture, it is to be hoped that all the valuable information contained in (at least) the reports of the three royal commissioners for the vineyard and wine industry of Portugal will find their way into general circulation. Those commissioners were evidently no respectors of persons, and have done their work conscientiously, and expressed their thoughts, whether the subject-matter deserved praise or blame, with the utmost degree of fearlessness. Each one is a professor of chemical science in one or other of the great agricultural institutions of Lisbon ; and each has a social position quite independent of his chair as a professor. Hence they can praise and criticise where it is deserved, and criticise and blame with a vengeance where they think it needed.

I have selected, as specimens of the services they have rendered, their reports on the wines and vineyards of those districts of Portugal which I think most likely to interest our vignerons at present, because their produce may be already known to them, either by having seen or heard of its character. Such are Bucellas, Carcavellos, and Colares. No allowance need be made for adverse criticisms, and but little for the occasional outbursts of praise of wines localities. Those only who have resided in, or at least slowly travelled through, the wine districts of the south of Portugal, away from city life, can form an idea of the quaint picturesqueness of the villages and quintas, of which a dozen or two at a time, with their restless small windmills and white cottages, half buried in evergreen trees, are in view from the top of every higher hill.

The scenery itself has a charm of its own. Away from Lisbon, the country of Bucellas and Colares has a freshness and greenness, maintained by the mists and showers of summer weather, rarely if ever seen about Lisbon, Carcavellos, or Setubal. Hence we may understand how even the most phlegmatic of the educated portion of the Latin race would as a matter of course express his feelings strongly, even in an official report, on such scenes and the verdure and teeming produce everywhere visible. All through the reports I find scattered the most valuable information for our vinegrowers, and only regret that it cannot now be got together for their use ; even the errors, mistakes, prejudices, and ignorance of the Portuguese wine people are painted in strong but truthful colors. The few samples I have selected will help to illustrate what I have written. In fairness to the royal commissioners of Portugal, I ought to say that the portions of their reports which I have selected are not alone those upon wines the names of which are among the best known to our people and on kinds most common here, but also that they are the shortest and least filled with details. Of their interest or practical value the intelligent reader must form his own opinion. I have translated them to the best of my ability as faithfully to the original as the idiom of Portuguese can be rendered in plain English.

Appendix B.

COLARES.

Colares and the surrounding neighborhood form a wine district, partly hilly, partly plains, which looks like a slice taken out of the province of the Minho put down in that of Estremadura, in a situation the most beautiful, whether we consider the soil or the climate.

If the vines of this locality were trained to trees, as is commonly the case in the province of Torres Vedras, without doubt Colares would produce the "green*" wine (*Vinho Verde*), such as is drunk in Braga or Basto.

Its high situation and proximity to the ocean render Colares as cold and damp as the Minho, and it is only by the greatest care in the cultivation that the grape in Colares attains to a degree of maturity superior to that which yields the green wine.

The result is that these wines are of a character intermediate between the ripe and the green wines, having the sweetness and grateful relish of the former, with the freshness, liveliness, and peculiar aroma of Tartar and Aldehyde.

But that which distinguishes the produce of Colares from all other wines of Portugal is, not alone the nice combination of the peculiarities of two great classes of wines, toned down and corrected one by the other; but to my mind the peculiar circumstance of their uniting the strength and body of heavy wine with the fineness, the delicacy, and the brilliant appearance of the most precious kinds.

Every one who for the first time drank Colares (not the common article, but good, legitimate Colares) will remember its occult virtue, which its outward appearance gave no evidence of.

It is a wine with the complexion of a woman, but with the metal and courage of a man. It is perhaps the only one of our wines of which we may say truly "*suaviter in modo, fortiter in re.*" In no other wine do appearances so completely deceive us.

Colares is a wine possessing all the requisites and qualities of the red growths of medoc. It is the most French wine that we have. Those who add brandy to this wine, to bring it up to the type of our other wines, commit an error in industry, and do violence to the elegance of good taste.

Brandy overpowers and obscures the delicate relish of this wine—it never amalgamates with it—robs it of the fine aroma of tartaric and lentyric ether, and leaves in their place the vinous, pungent, and alcoholic smell of ordinary coopered wines.

The red grapes grown about Colares are, for the most part, the following, viz.:—ramisco, parreira, mathias, castellao, gallego, dourado, molar, tintureiro. Among the white kinds are found the malvasia, castellao branco, arintho (probably reisling), &c.

The *ramisco* is the most commonly grown, and it appears to give this peculiar stamp and character to the wines of Colares.

The difficulty of getting the grapes to perfect ripeness has driven the vignerons of this district to adopt every known method of facilitating it.

The vineyards on the higher parts of the hills are protected from the damp winds of the sea by shelter formed of bushes and straw. Those that stretch from

* Green, *i.e.*, austere, rough.

the top of the hills towards the east, and over the low lands towards Murcifal, suffer less from the severity of those winds; but the damp catches them quite as bad, notwithstanding their more favorable exposure, for the masses of aqueous vapour coming from the ocean become condensed on the high land, and fall in showers or mist on the eastern side and the valleys lying below.

They expose the grapes as much as possible to the sun, removing leaves from the vines; but the bunches are not customarily laid on dry floors; a practice which would be to my mind of the highest value for securing some additional aroma, in which it is deficient, the want of which alone prevents it ranking on equality with the very finest growths of Bordeaux.

The grapes are not stripped from the stalks, and this I consider another fault in the wine-making, because the juice of the stalks, in this part extremely green and austere, must, one would think, diminish the best properties of the wine, and load it with crude matter, rendering the need of brandy indispensable for softening it.

Notwithstanding the vintage was over when I made my visit to Colares, I nevertheless found means of obtaining the principal kinds of grapes, for the purpose of estimating the saccharine strength of their musts. The following are the results obtained :—

Kind of Grape.	Saccharine Strength.	Absolute Alcohol in the Wine.
Ramisco	17	8·2
Molar	18	8·7
Malvasia	17·5	8·5
Castellao tinto	18·4	8·9

Now I have found in some wines of Colares that I examined, after they had passed into commerce, as much as 12 per cent. of absolute alcohol. This wine had had 3 per cent. added. This is an excess in fortifying, for which the producer should not be blamed, but the wine merchant.

To render what I have said more clear I may state that there are in Colares, as in other places, both good and poor wines, but all of the same stamp. The dealer buys both the bad and the good, and it almost always happens that he sells the bad, which he bought cheap, on the strength of having bought the good. When the blend has been made, the result is of course inferior to the good wine, so the brandy is called in, whether required or not, to cover, as far as possible, the insipidity produced.

In Colares no one buys a parcel of wine without also having to take a quantity of inferior quality. The dealer gives in to the terms, because he finds ready to his hand the means of making the whole into one uniform kind. But whoever desires to get a parcel wholly selected and reject the inferior will find the greatest difficulty in effecting a bargain, even at a very high price.

They told me that during the present year, when the price per pipe of 205 gallons ruled from £11 to £13, no one could obtain selected samples for less than from £17 to £19 sterling.

Notwithstanding that the wine was already in cask (toneis), I had a mind to form my own notion of the condition of the wine cellars, and so visited several. They

all seemed to be very inferior, with little accommodation. In one of them the wine press was turned out and placed under a shed.

Not a few of the vignerons have no wine-press of their own, and have to borrow the use of those of their neighbors. From the town of Colares many go to Murcifal, a distance of a mile, to make their wine.

Their methods of making and treating their wines are in every particular the same as those in use at Torres Vedras, with the exception that the Colares men do not sweeten or use brandy in their wines.

Appendix C.

"By order of His Majesty the King of Portugal, issued in an instrument bearing date 24th August 1867, the royal commission appointed in 1866 for the purpose of studying the methods of wine-making in the various centres of viticulture throughout the kingdom, is directed—

1. To continue the same studies during the vintage of 1867.
2. That on this occasion they should give advice to persons employed about vineyards as to the best means of cultivating vineyards and making wine.
3. That they should point out the parts of the kingdom where and the time when conferences of vignerons, exhibitions of wines, and special meetings of proprietors should be held, and prepare programmes to be carried out on such occasions.
4. Finally that they should study and propose to the Government the localities, and the requisite conditions for organizing provincial schools, or *vineyard and cellar schools*, for the advancement of the wine industry, by exemplification of sound processes of viticulture and wine-making, as well as to facilitate the education of cellar masters *(feitores vinicolas)*.

"For fulfilling these important duties the entire kingdom was divided among the same three royal commissioners as the year before, and to each assigned the same portion.

"In rendering an account of the performance of these duties imposed on us by the renewed commission of 24th August, I shall follow the order in which they stand, as far as compatible with the nature of the object, and the brevity I am obliged to use in reporting this work."

After detailing through seventeen pages of close print and very condensed language his inspection of the north of Portugal, and the perfections and imperfections he met with in the processes of cultivation and cellaring, Viscount Villa Maior comes to the direct means to be adopted in restoring to vigor, and developing the almost dormant capabilities of Portugal, as a great wine-yielding country.

No doubt this translation will fall under the eye of some who, like myself, have heard or read the Honorable Mr. Michie's famous lecture on "Victoria suffering a Recovery," who will not fail to recognize in the tone of the Portuguese Viscount something like that of the lecture of our present Agent-General. A touch of comparative poverty had brought our people to their senses, and Mr. Michie seized the point at which a turn to better days and more sober thoughts had shown itself. Mr. Gladstone's tariff admitting the pure cheap wines of France at a very low

duty soon told on the Portuguese market. As pure cheap wine became known to the British consumer, the dear, hot, rank brandied ports and sherries were thrown aside; and Portugal had to look about for markets.

Then came to pass what the late lamented Baron Forrester strove to teach the Oporto-wine men, but to no purpose, viz., that sooner or later their fortified wines would ruin the country's name and trade. When they realized the devastations of the wine disease, and invasion of their favorite market, the Government set about doing at last what should have been begun fifty years ago; and kept advancing in industry with the advances made in chemistry and the physical sciences. How they are going to try to make up for lost time and opportunities will be found in the following translation, out of which, hints not a few may be taken at this day by our statesmen who regard our future progress.

The Viscount proceeds:—

"The propagation of sound views upon all wine matter, the diffusion and popularizing of scientific principles of viticulture and œnology, and the stimulating of progress in these branches, are conditions essential and infallible of the increase of public wealth, and of the well-being and moral advancement of the people.

"Lectures by professional men carrying information to centres of production; exhibitions of the produce of districts displaying progresses made and exciting laudable desires of honorable distinction, rewarding in a worthy manner successful laborers, and pointing them out as examples worthy of imitation—these and such like are the very profitable means which Governments, zealous for the good administration of the public estate, have put in practice for the regeneration of agriculture. The wine industry can only hope for great benefits arising out of the employment of these means; and sound policy demands that they should be had recourse to in a country which derives from this source so large a portion of its public revenue.

"In the expression of the royal will conveyed in the commission of 24th August 1867, recommending to the commissioners to point out the places where and the time when the free conferences and exhibitions, as well as general meetings of vignerons, should take place, the Government showed its intention of reducing to practice a thought so fruitful.

"I ought, I consider, as a member of the commission, to say frankly what I think in this regard, in order to do justice to so honorable a charge, keeping myself, however, simply, in this report, to what directly concerns the provinces of the north, in order not to prejudice the opinions of my colleagues. Already upon all these matters I have on two occasions represented briefly to the Government my own ideas; still, nevertheless, I ought to explain them again in this place.

"The means pointed out in the commission, 24th August, to promote the regeneration of viticulture in our country, lie in exhibitions, district clubs, or meetings, conferences and provincial schools of viticulture, or *vineyard and cellar schools;* still I venture even yet to propose, in order to render these means complete, the formation of (*comicios*) local bodies with power to make their own bye-laws, and their embodiment in a general viticulture society (winegrowers' association), and meeting free and open to all winegrowers and traders in wine.

"The provincial schools, and the conferences, which in their very nature are free lectures, without scholastic formalities, constitute the means of teaching and the

propagation of sound instruction. Exhibitions and public meetings of vignerons enter into the means for arousing public interest. The (*comicios*) district winegrowers' associations, and their mutual combination to form one general viticulture society, furnish another order of means—those of free discussion and the representation of all kinds of winegrowers' interests.

"Professional instruction, discussion, and excitement, all converge to the same end, and being in harmony, they cannot but produce positive and rapid results, which efforts individual and isolated could hardly with difficulty effect, no matter how well they might be directed.

"The regeneration of the wine industry is of the greatest consequence to our country, not to say of urgent necessity. Everyone knows that, in relation to our external commerce, the exportation of our wines is the most important and conspicuous; but when we consult our statistics and compare them with those of other wine countries, the truth is forced upon us that we are still far from being in a satisfactory state. I have before me, from an official source, a comparative statement of the totality of our wine produce, both on the continent and the islands, for the years 1853 and 1862. In it I see that our total produce in 1853 was 3,079,058 hectolitres. Out of this only 1,820,910 hectolitres were ripe wine, all the rest green. The produce of vineyards in 1862 was 776,311 hectolitres, of this there being only 654,061 hectolitres.

"Let us now see what in 1863 was the yield of only a single department of France, the Herault, which produces many wines analogous to ours: it was 6,718,329 hectolitres. It may be that our statistics are far from being completely reliable; still, after making whatever corrections we like, that which admits of no doubt is, that Portugal, essentially a wine country, does not produce one-half of what the Herault yields, only one department of France, whose dimensions are 6198 square kilometres, with a population of 409,391 inhabitants.

"Nothing more is needed surely than this simple example to convince us how we have fallen behind, and how much we have to do in order to recover the place we ambition, and which we ought, as a wine country, to occupy, in order to do justice to our pretensions. Our regular export does not now reach to 300,000 hectolitres of wine; and if we do not export more it is because we do not produce sufficient of such character as will pass in foreign markets. There is one general rule:—He who produces little, always produces dear; and he who produces dear, always sells little and bad!

"Reverting now to the means stated above, I will say what I consider the readiest way of giving them practical effect.

"The provincial wine shows, the conferences on wine matters, and the meetings of the winegrowers' associations (*congressos*) may, to my thinking, be all carried out at one time in each region, in some locality which may be selected as most convenient for the purpose. The wine shows should be once a year, and devoted principally to the exhibition of *new* wines. These wine shows, likely enough, might eventually create wine *fairs*, like the ancient Regua Fair, in order to give facilities for sale and purchase both to the vignerons and the wine traders.

"As to the details which must form part of the programme, I will say nothing at present, as these should be the joint work of the commissioners."

Regarding the 3rd article of the royal commission nothing further need be said at present than that they are an extension of the objects contemplated and partly realized by our own vignerons' clubs, and societies, and wine shows.

On the 4th article the commissioner proceeds, after detailing his views at considerable length, to summarize them as follows—the nature and requirements of *district schools of viticulture*, or *vineyard and cellar schools*:—

"District vineyard schools, as I have already pointed out to the Government, ought to have—

1. A vineyard to serve as a model of good planting and cultivation, in which experiments could be conducted upon the different methods of planting and all that appertains to the management of vines.
2. A living collection of all known kinds of vines growing in the country, and of the best foreign ones also, not merely for the purpose of studying them and facilitating their classification and nomenclature, but also to experiment on, with a view to discovering the various degrees of fitness in the same kinds for producing wines of different characters.
3. Wine-press and cellar, with all kinds of utensils and vessels for storing wine, to serve as models both for experiments and for showing the methods of wine-making and the treatment of wines.
4. A model cooper's shop, fitted with forge and all necessary appliances for repairing all kinds of vessels and tools used about the cellar or vineyard; not alone as a convenience, but also as means of instruction for the pupils.
5. A chemical laboratory suitable for analyses of soils, for testing *musts* and wines, and indeed for everything concerning œnology.
6. A still-house fitted up with suitable appliances for teaching and showing economic distillation in rural establishments.
7. Collections of rocks, chemical products, philosophical instruments requisite for illustrating physics and meteorology, and whatever may be necessary for the study of the allied sciences.

"The course of instruction, over and above the practice of all kinds of labor in the vineyard, the wine-press, in the cellar, and in the cooperage, will comprise the elements of geology, botany, meteorology, chemistry, rural economy, viticulture, and œnology; each and all of these being carried only so far as is indespensable for a thorough knowledge of the wine industry.

"One director, one professor of sciences, one master vigneron (*mestre feitor*), a cooper, and a secretary, might be a sufficient staff to commence with.

"For instructing ten pupils, about twenty acres of available vineyard land would suffice; and the annual cost (in Portugal) about £1250.

"The selection of pupils might be made by any extensive combination of vignerons; by private individuals, and lastly by the Government; but in no case until the pupil has passed a satisfactory examination in primary education.

"A complete course of education for a vineyard-master (*feitor vinicola*) should be gone through in three years, provided always that the theoretical instruction was accompanied with the practical.

"The theoretical courses, and practical demonstrations, shall be open to all, that anyone may turn them to his own account, and profit by the instruction imparted.

"I do not venture to say that the system I have proposed is perfect, nor even the best that henceforth might be reduced to practice. Still I am convinced that it can easily be worked, and one part made to fit into another, and that from its

establishment will result a great impulse to viticulture—in the direction of its advancement and restoration; advancement and restoration which, beyond being an imperious necessity for Portugal, is more than all a duty.

"VISCOUNT DE VILLA MAIOR.

"Moncorvo, 4th February 1868."

N.B.—I have given the *résumé* as closely as possible to the idiom of the original, so far as the numbered paragraphs go; and the remainder more freely, but imparting faithfully the author's meaning.

JOHN I. BLEASDALE, D.D.

St. Patrick's, 1st June 1873.

APPENDIX D.

REPORT OF THE PORTUGUESE ROYAL COMMISSIONER JOÃO IGNACIO FERREIRA LAPA, ON THE DISTRICT OF BUCELLAS, 1868.

TRANSLATED BY REV. J. I. BLEASDALE, 1ST JUNE 1873.

In my report last year I sketched a short parallel between the method of cultivating the vine on the Tagus and on the Gironde; and from this parallel I endeavored to eliminate a truth, viz., that the Tagus has no need to envy the Gironde, neither on account of the extent and variety of the wine-producing districts scattered along its banks, each one devoted to a peculiar character of wine, nor on account of the diversity of bouquet and body found in this numerous variety of products, which, in my opinion, need only to be better known in order to be thoroughly appreciated. To render the parallel more complete, I would assert that in these districts we have one almost wholly devoted to white wines; a district in which are produced Barsac, Sauterne, Beaume, and even the Chateau d'Yquem, this famous *Yquem, roi des vins; Yquem, vin des rois!* This region, whose fame is far less than it ought to be, for we have yet to learn how fully to appreciate our own best produce; this region, which France would, if she could, carry off bodily and locate in the unoccupied space between Barsac and Sauterne, in order to round off and complete her district of the *noble white wines* of the Gironde, is BUCELLAS. Bucellas, hidden secluded, surrounded by high hills, and almost forgotten among its narrow valleys, is that rough diamond which no one gives himself the trouble to cut and polish and mount as it deserves to be.

Those who are acquainted with the Bucellas wine of commerce, or in its unripe state, or the coopered article, can form no idea of genuine old Bucellas, such as may be met with in the cellars of some few connoisseurs. Generally speaking, even the Portuguese have no true idea of Bucellas. It is necessary to go to the headquarters of this wine in order to know to what a height of refinement it can be brought, when it is kept in its native purity, and when it has been left to time, and to time *alone*, to develop its perfume, color, strength, and that peculiar sweet substance forming its delicate taste, and which floats over the palate like liquid velvet.

On the occasion of my travelling through Bucellas I was hospitably entertained in the house of my excellent friend Senhor Machado, a cavalier abounding in every estimable quality, who gave me the opportunity of tasting his private samples, few in number, but distinct in character, and selected with good judgment. When tasting these wines I was able to satisfy myself of many matters relating to the chemical life

of wines in general, and in particular of the peculiar nature of the wines of Bucellas. You may meet with red and white wines of this kind without being able to distinguish which is which, either by their color, their aroma, or any property which affects the palate, after they are ten years of age. The reds become lighter and lose coloring matter, and the whites grow fuller in body and deeper in color.

It is worthy of observation that since these wines are made by a slow and very long-continued fermentation, they should run through their cycle of changes and become ripe in so short a period of time, seeing that others require fifteen, twenty, or thirty years to attain to it.

This slow fermentation has a singular effect on these wines, of which I shall have something to say by and by, which, however, concerns only the infancy of the wine.

The red wines deposit their coloring matter, as said already, and eventually become of a topaz-yellow. The whites assume a deeper color, owing to the oxidation of a portion of their tannin, which is not by them precipitated as by the reds. That it is to the slow oxidation of the tannin that the deepening of the color of white wine is due, we evidence from the circumstance that white wines fermented for a little while on the stalks and husks assume the *golden* or yellow color much more rapidly. No matter how pale and clear a white wine may be, if we add to it pure tannin only, in very minute quantity, we shall soon see it assume the golden tint, then the yellow, and after a few days a chesnut, or that of weak coffee. But supposing we consider it desirable to ferment the must on the stalks, or, what is much the same thing, add to the wine the last outcome of the wine-press, or even if we throw in a moderate quantity of pure tannic acid, if we add a proportionately small quantity of sulphurous acid gas, dissolved in water, we shall find that the wine is not affected in color in the least. This proves that the cause of the wine acquiring a deeper color is the oxidation of the tannin, (?) because, since this oxidation is prevented by the sulphurous acid gas, no discoloration takes place. And here is a bit of useful advice for those who like to ferment their white wines to some extent on the husks, yet do not wish them to have a color too deep when they attain maturity. Many practical wine-makers consider the fermentation with a portion of the skins useful in protecting the wine against change.

There is one particular circumstance about the grape called "Arintho," in the Bucellas district, which, to my mind, explains the cause of the slow fermentation possessed by the wines of this locality, and gives them that gaseous quality which they all have while they are young. This particular matter to which I allude is that the *must* of this grape contains much of a substance, called sometimes "pectin," and more correctly "pectic acid." The must is usually so highly charged with this viscous, sticky matter, as to render it necessary, in taking the glucometric strength, to add an equal quantity by measure of water, and then of course multiply the result by two. I consider that this quality, which is met with, but in a lesser degree, in other white grapes of Bucellas, is due to the influence of a chalky soil, which indeed seems to be the general character of this district. It is well known that the most strongly effervescent wines are the produce of vines grown upon loamy soil. The genuine champagne comes from an almost pure chalk soil. The reason is found in the chemical action of lime on vegetation.

Loam, or fuller's earth, is a substance which favors in the highest degree the formation of substances of a cellular nature, among which, and perhaps as the first start of condensation, "pectin" ought to be considered—just in the same way as magnesia tends to the formation of starchy matter, alkalies to the production of sugars, phosphorus and nitrogen the creation of albuminous substances, and iron the formation of

color and aroma. Hence it comes that, in soil more than ordinarily charged with lime, there is a tendency in all the softer parts of shrubs to become wood, and in all their juices to turn to "pectin;" each one behaving according to its capability for condensation, in accordance with the predominating agent in the vegetation.

Now, whence comes it that this quality of the *must* of the "Arintho" grape retards fermentation, and leaves the wine more or less charged with gas? The reply is easy and natural. When the *must* contains much pectin (pectic acid), it is difficult to expose it thoroughly to the air, on account of its being more or less pasty, and prevents intimate contact between the nitrogenized matters and the sugar. The pectin, in fact, acts somewhat like a varnish interposed between the component parts of the must. Hence the slow and prolonged fermentation. The change and breaking up of the materials, instead of taking place almost at once, will go on slowly from particle to particle. The period of tumultuous fermentation lasts, in Bucellas, eight, fifteen, and thirty days, and occasionally longer, during all which time much sugar is being split up. Bucellas wine is one of long making, and, even at the end of three or four years, we may say it is yet to be made!

JOÃO IGNACIO FERREIRA LAPA.

Appendix E.

DISTRICT OF CARCAVELLOS.

"The wine district of Carcavellos is situated at the mouth of the river Tagus, and immediately behind the great fortress of St. Julian da Barra, the wines of which were in other times so celebrated as to be considered second only to those of the Douro and Madeira. Although this district comprises several parishes, and an extent of not less than six square miles, Carcavellos alone is the place where has been produced the most highly prized wine of that name, and along with it the so-called loins (*lumbos*) of Carcavellos, certain long strips of country of especial excellence. These 'loins' are certain gently sloping hills reaching down to the seacoast of Carcavellos. These lands are composed partly of marine deposit, and partly of rocks, with full exposure to the south-west. They are dry without being arid, conditions to which they owe probably their exceptional superiority over others not very distant from them.

"The soil formed out of the deposits which have covered more or less completely the secondary formation (a condition of the earth which appears to extend along the whole Atlantic coast from the mouth of the Tagus, as far as Aveiro), presents in Carcavellos a subsoil well mixed with clay (agilla), sand, and lime, resting on a subsoil at one time marly, at another on one composed of loam, clay, nodules of iron and quartz, called in the original 'cascalho,' and in places on a sort of fuller's earth, any one of them calculated to produce vineyards, and of course wines, each fine in its own special kind, provided the land has had all along suitable treatment, good manure above and efficient drainage below." * * * * * * *

Senhor J. F. Lapa then proceeds at considerable length to show that all the great wine districts of Europe are situated in positions not very different from Carcavellos, viz., on the banks of rivers; and though this particular one is partly open to the south-west Atlantic, it has the exceptional advantage of the prevalence of winds from the land during the growth and ripening of the fruit. He instances the rare old vine-

yard of Tokay, planted by order of the Emperor Probus in A.D. 280, on the mountain of that name, between Buda and Cracow, at the mouths of the rivers Theisse and Brodog. The gentle hills which surround Lake Averno, between Puzzuolo and Baia, produce at Falernian, "*generosum et lene*" so praised by Horace. The Johannisberg and the other grand wines of Germany are produced on the right and left banks of the Rhine and the Meuse. The cultivation of the vine in Medoc, reckoning from the head of the Graves, lies for the best part on the left bank of the Gironde, and is continued on the borders of the Dordogne and the Garonne. In Portugal the grand wines of Estremadura are grown on the borders of the Tagus; and those of Oporto on the steep hill sides of the Douro. They have a saying on the Douro regarding the best position for vineyards, that "a vineyard should have its foot in the river and a stove at its foot" (*a vinha deve ter o pè no rio e um fogão ao pè*), and again, that the vineyard ought to be within hearing of the splash of the boat's oar ("*deve ouvir bater a espadella do barco*"). All this of course means that the vicinity of rivers and running streams is the most favorable position for vineyards; neither too high, lest the cold should interfere with the ripening of the grapes, nor too far from the banks that they may not be deprived of the advantage of the more equal temperature caused by the river.—[Condensed, J.I.B.]

The author continues:—"Carcavellos at the present day (1868) is hardly a shadow of what it was. Oidium destroyed its prosperous vineyards. From 3000 pipes it formerly yielded, it is now reduced to 12 pipes, and these are made by only two vignerons, the Srs. Paulo Jorge and Dias Pereira.

"There is nothing particular to note about the method of wine-making in Carcavellos. The system here is the ordinary one, and perhaps the least faulty of the kind.

"The fermentation is long, but complete. All the natural sugar of the musts is broken up. In Paul Jorge's cellar I took the saccharine strength of his white wines, and found it to be, twenty-seven days after commencing to ferment, in one 1·5 per cent., and in another 1 per cent. They were nearly dry.

"In a red wine, eighteen days made, I found 4 per cent. of sugar, but it would be dry in ten days more.

"Consequently the sweetness which we find in Carcavellos wines depends entirely on the boiled must (arropè) which is added afterwards.

"When this arropè is added, to prevent mishaps it is necessary to add spirit, say 2 to 3 per cent., but which in fact never stops at that point; at any rate if we take into account the quantity already added to the arropè.

"The wines of Carcavellos, both red and white, on distillation yield generally 20 per cent. of absolute alcohol. Calculating that the mean saccharine strength of the musts is 28 per cent., which corresponds to 14 per cent. of alcohol, the total amount of spirit added will be not less than 6 per cent.

"Carcavellos wines, like those of Oporto and Madeira, improve much by keeping. They soon lose a portion of their coloring matter, and they acquire a perfume at the end of four or five years so fresh and grateful that they might be thought wines of greater age. We have few wines which so soon ripen.

"The arropè and the spirit are the two great matters to which the vineyard owner has recourse, or the two great sources of his prejudices about wine-making, according to the circumstances under which they are employed. They somewhat resemble those heroic remedies which either save the sick man's life, or hurl him into his grave."

Lisbon, 1868. JOÃO FERREIRA LAPA.

Appendix F.

EXTRACTS FROM THUDICHUM AND DUPRÉ.

As a further advancement of the wine industry, it has appeared to me desirable to add in an Appendix two or three chapters from the latest, and apparently the most carefully written work on wine in the English language, that just issued by Thüdichum and Duprè, chemists, who have made the study of wine their specialty, and have conducted more careful, exhaustive, and original investigations into the nature and rarer properties of wine than any others that I have heard of. I have purposely omitted the scientific details.

Guyot says to viticulturists—"Plant your new vineyards with the finest vines that you can get in your neighborhood. Each of you can distinguish them perfectly well in your locality. You know their qualities and faults better than the proprietors or men of science. Take the best plants, cultivate them carefully, adopt the mode of cutting which makes them fertile, give them the manure which is necessary, and you will find that the revenues of your vineyard double; you will find that while before your vineyard nourished only one family, it will now feed two. The salaries will augment, the land will get richer, and you will contribute to increase the wealth of France."

To the proprietors he says—"Buy the canes of the reputed vineyards of your neighborhood; collect the canes of the fine varieties of vines in your own vineyards, plant them in nurseries, and train up new plants which will enable you to replace vines which have died in your established vineyards, or to plant new vineyards altogether. Do not provine, but fill up all places which have become vacant by two-year plants from the nursery. Carry earth and manure to the extent to which the vineyard requires it. Maintain your vines with trunks, and cut them upon a fruit-branch and a wood-branch. Do not spare hand labor, and you will find that your wines will be double in value, and that their quantity will be as great as that produced by the coarsest vines."

To the Government M. Guyot says—"Make yourself the instrument of collecting all the canes of the best growths of France immediately after the cutting; plant them in nurseries, and you will have in two years, at a very small expense, millions of vines. If each thousand of these vines be sold at five francs, the revenue will amply cover your expenses. Create in Algeria, in the Landes, in Sologne, in the Champagne, model vineyards and nurseries, from which the deserts which are so close to all these places could be populated; and after ten years the capital employed will return you 10 per cent.; the colonies will be fixed, and the wines of France will be bought by all the world. If to these immediate means you superadd the importation and study of foreign vines, and carry on their treatment to the completion of the process of vinification, you will establish the science of viticulture and œnology on a definite and solid basis."

Selection of the most suitable species for the different parts of France:—

In the South and South-East Districts of France.

For box raisins.

Mayorquin, ou Bourmen.	Panses.

For liqueur wines.

Furmint.	Malvoisie.
Grenache.	Muscat blanc.
Maccabeo.	Muscat noir.

FOR GOOD WINES.

Carignane.	Rousanne.
Clarette.	Rousselet.
Marsanne.	Rousette.
Petite-chiraz.	Ugni.
Picpoule.	Viounier.

IN THE SOUTH-WEST DISTRICTS.

FOR THE BEST WINES.

Carbenet.	Muscadelle.
Carbenet gris.	Sauvignon.
Carmenére.	Semillon.
Cruchinet.	Verdot.

FOR THE BEST BRANDIES.

Folle-blanche.

TESTS FOR ACETIC ACID.

The presence of acetic acid, or an acetate, may be recognised by heating the liquid to be tested with sulphuric acid and alcohol, when acetic ether is produced and easily recognised by its agreeable, refreshing odour; or, without the addition of alcohol, the liberated acetic acid may be recognised by its characteristic smell. Solutions of neutral acetates give a more or less intense blood-red coloration on the addition of perchloride of iron, which is destroyed by the addition of strong mineral acids as well as by boiling, basic acetate of sesquioxide of iron being thrown down in the latter case. If the acetic acid, as is the case in wine, is mixed with a great many other substances, it should be separated from them by distillation, and the tests applied to the distillate, neutralized, if necessary, by potash or ammonia.

Very minute traces of acetic acid may be recognised in the following manner:— If the acid is already in combination with an alkali, the test may be applied directly; but, if such is not the case, the acetic acid must be separated by distillation with somewhat diluted sulphuric acid, the acid distillate neutralized by carbonate of potassium and evaporated to dryness. This dry residue is mixed intimately with a little finely pulverised arsenious acid, introduced into a glass tube and heated. The acetate and arsenious acid react on each other with formation of oxyde of kakodyl, easily recognised by its penetrating offensive odour. A second method of recognising minute quantities of acetic acid consists in boiling the liquid suspected to contain free acetic acid, or the distillate obtained after the addition of sulphuric acid, with freshly precipitated carbonate of silver, filtering the hot solution and evaporating to a small bulk; the last drops are then placed on a microscopic slide and allowed to cool, or, if necessary, allowed to evaporate spontaneously still further. The acetate of silver crystallizes in characteristic forms, and cannot easily be confounded with other crystals. It is advisable to compare the crystals with those produced by the evaporation of a few drops of a pure acetate of silver solution.

That the volatile acid of the wine is almost all acetic acid is readily proved by estimating its atomic weight. Several hundred grammes of the wine to be examined are carefully distilled nearly to dryness; some water is added to the residue and again distilled; these additions of water and distillations are repeated until the distillate coming over is no longer strongly acid. The entire distillate is then

neutralized with carbonate of soda and evaporated to dryness on a water-bath. The residue is taken up in a little water acidulated with diluted sulphuric acid, and any hydrochloric acid it may contain precipitated by the careful addition of a little sulphate of silver solution.

The liquid poured off the chloride of silver is then distilled, and the acid liquid neutralized with pure carbonate of baryta. The clear filtered solution is evaporated on a water-bath, the residue dried at a temperature of 115°, and weighed. It is then decomposed by sulphuric acid, and the resulting sulphate of baryta weighed after ignition. From these data the equivalent of the volatile acid is readily calculated. Pure acetate of baryta should contain 53·54 per cent. baryum.

Aldehydes in Wine.

An aldehyde is the first product of the conversion of a primary alcohol into its acid by means of an oxydizing agent, thus :—

$$\underset{\text{Alcohol.}}{C_n H_{2n}} + {}_2O + O = \underset{\text{Aldehyde}}{C_n H_{2n} O} + H_2 O$$

$$\underset{\text{Aldehyde.}}{C_n H_{2n} O} + O = \underset{\text{Acid.}}{C_n H_{2n} O_2}.$$

The only aldehyde of the series which has been proved to be present in wine up to this time is acet-aldehyde (C_2H_4O), produced by the oxydation of ethylic alcohol. It seems not improbable, however, that wine owes part of its bouquet to the presence of some of the higher members of the series.

Their presence may perhaps be inferred from the considerable absorbing power for oxygen possessed by some wines, a property highly characteristic of aldehydes.

Acet-Aldehyde.

Wine, when exposed to the action of atmospheric air, is gradually converted into vinegar. If a tolerably free access of air be permitted, the only product formed from the alcohol is acetic acid. If, however, the access of air is very limited, oxydation frequently stops short at the first stage, and aldehyde is formed. This conversion of alcohol into aldehyde and acid (acetic fermentation) seems to be promoted by the presence of albuminous substances (though it is not by any means, like alcoholic fermentation, dependent on these); and, accordingly, wines containing such matters are much more liable to this fermentation than such as are free from them.

Aldehyde may be prepared by oxydizing alcohol by means of binoxyde of manganese and dilute sulphuric acid. It forms a colorless, very mobile liquid of extremely suffocating smell, the inhalation of its vapor causing spasms of the glottis. Its elementary formula is C_2H_4O. It boils at a temperature of 22° C., has a specific gravity of 0·8055, and mixes with water, alcohol, and ether in every proportion. When exposed to the action of the air, more particularly when diluted, it rapidly absorbs oxygen, and is converted into acetic acid. When boiled with silver salts, it reduces them to the metallic state, the silver being deposited as a bright mirror on the sides of the vessel. This reaction may be used to detect the presence of even minute quantities of aldehyde. Of course no other substances having a similar action on silver salts, as formic acid for example, must be present. Nascent hydrogen reconverts the aldehyde into alcohol ($C_2 H_4 O + H_2 = C_2 H_6 O$).

The presence of aldehyde in a wine, even in very minute quantity, is readily detected by its very peculiar and characteristic smell and flavor. If such a wine be neutralized by an alkali to fix the volatile acids, and submitted to distillation through a well-cooled condenser, the aldehyde may be readily detected in the

first portions of the distillate by its smell, flavor, its reducing action on silver salts, and by its easy conversion into acetic acid.

GLUCOMETERS.

Those, therefore, who would produce good wine should allow their grapes to hang on the vine as long as is compatible with the safety of the harvest. From time to time samples of grapes should be collected from the vineyard, the berries should be mashed, pressed in a little hand-press, and the juice obtained subjected to examination, particularly as regards the amount of sugar and acid present in it.

The sugar can be easily ascertained by the use of a so-called "Glucometer," or spindle of glass, such as is used for ascertaining specific gravities in general. The scale of the glucometer should be so divided as to indicate per cents. of fruit sugar directly, and not imaginary degrees arbitrarily fixed by inventors. But any "Gravimeter" indicating specific gravities can be used to ascertain the density of a must, and from that the amount of fruit sugar contained in it can easily be calculated. Some convenient French glucometers are so arranged as to indicate, by one degree of their scale, a quantity of fruit sugar, which, after fermentation, would yield a volume per cent. of the must of absolute alcohol, that is about 1500 grms. of sugar per hectolitre of must. When the sugar is calculated from the specific gravity found absolutely, the total solids found must not be taken for sugar only, but from one-tenth to one-fifteenth has to be deducted as being other matters than sugar. The sugar can be determined absolutely by the chemical and optical methods of saccharometry described in a subsequent chapter. Must which would yield from 6 to 8 per cent. of alcohol will give only "small wine," and grapes showing this quality of must should not be harvested. When the samples of must produced show above 8 per cent. of future alcohol, the vintage may be contemplated. But it should never be actually undertaken as long as by repeated trials any increase in the quantity of sugar in the grapes is observable. Even when the sugar has attained its maximum, and remains stationary, it is not on that account necessary to proceed to gather the grapes, as, if the season be favorable, they will still undergo beneficial changes by hanging upon the vine. In the north and centre of France must will seldom show more than 15°, but, in the hottest regions of the south, in parts of Spain, Italy, Cyprus, Madeira, must is produced which shows up to 24°, *i.e.* degrees of the French glucometer. Of course this sugar can never be entirely transformed into alcohol, as the action of fermentation ceases in any fluid containing above 16 per cent. of alcohol. The excess, therefore, remains as sugar, as in the liquorous wines of Lunel, and the sweet Sauternes, which are now taking the place of Lunel. If it is not intended to produce such syrupy wines, the must produced can be reduced by the addition of water to 15° or even 12°, and will then ferment completely and produce dry wines of the best character. This dilution of a heavy must is preferable to the harvesting at the time when the trial juice shows from 12° to 15°. If, on the other hand, a must coming from good vines, in an unfavorable year, shows but 8° of future alcohol, it may advantageously receive an addition of pure cane sugar up to 12°, every degree requiring an addition of 1500 grammes of cane sugar to each hectolitre of must. In no case should artificial grape sugar, or starch sugar, or glucose be used. We have tried a variety of the best and whitest samples which can be procured, and find that they all impart a nasty taste to the fermented product. When the viticulturist has decided all the questions raised by these considerations, and made his preparations accordingly, he should proceed to the actual vintage.

APPENDIX N.

CORRESPONDENCE, ETC., RELATIVE TO COLONIAL WINES FORWARDED TO EUROPE FOR EXAMINATION.

No. 3326. Chief Secretary's Office,
Sir, Melbourne, 6th December 1870.

I enclose a letter (5th December) addressed to you by the Chairman of the Wine Committee of the Board of Agriculture, requesting your co-operation in obtaining the opinion of competent judges of wine as to the quality and value of some samples produced in this country, which are about to be consigned to you for that purpose.

I need hardly say that you have authority to carry out the wishes of the Board.

I have, &c.,
(Signed) JAMES McCULLOCH.

George F. Verdon, Esq., C.B.,
Agent-General, London.

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18 Queen street, Melbourne,
Sir, 5th December 1870.

I have the honor to transmit herewith a preliminary letter to the Honorable Geo. F. Verdon, C.B., in reference to the samples of wine which the Wine Committee of the Board of Agriculture propose to forward by an early opportunity, for the purpose of obtaining the judgment of parties in London as to its quality, and regarding which Mr. Middlemiss and myself had the honor of waiting on you a short time ago.

I have, &c.,
JOHN ORR.

The Honorable Sir James McCulloch, K.M.G.,
Chief Secretary.

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789 | 71. 8 Victoria Chambers, Victoria street,
Sir, Westminster, S.W., 27th January 1871.

I have the honor to acknowledge the receipt of your despatch of the 6th ultimo (No. 3326), enclosing a request from the Wine Committee of the Board of Agriculture (5th December 1870), that I will have some samples of colonial wines tested in this country, and authorizing me to comply with it.

Upon the receipt of the samples referred to, I shall have much pleasure in obtaining the opinion of competent judges upon them.

I beg leave to request that the answer to Mr. Orr's letter, enclosed, may be forwarded to him.

I have, &c.,
GEO. VERDON,
Agent-General.

The Honorable the Chief Secretary,
Melbourne.

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741 | 71. 8 Victoria Chambers, Victoria street,
Sir, Westminster, S.W., 27th January 1871.

I have the honor to acknowledge the receipt of your letter of the 5th of December last, informing me that the Wine Committee of the Board of Agriculture have determined to send a quantity of Australian wine to England to be tested, and requesting me to obtain the opinion of competent judges upon it.

It will give me very great pleasure to comply with your request, and I will spare no pains to have the wine tested under the most favorable conditions, and by persons whose judgment will be of some practical value to the wine producers of Victoria.

I have already availed myself of such opportunities as I have been able to command of making the Australian wines known in England, and I wish I were in a position to say that they are making as much progress in English consumption as I think they deserve. The cheap wines of France, Greece, and Hungary have obtained a strong hold in this country. They are prescribed by physicians, recognised by the wine merchants, and asked for by their customers; but the Australian wines are always treated as unusual and experimental, and the great uncertainty in the quality of various kinds, and even in different lots of the same kind, makes it very difficult for the wine merchants to recommend them.

Messrs. Leigh and Appsmith, of the City, have purchased the produce of the Auldand vineyards of South Australia for some years, and are advertising them largely, but I doubt if they are satisfied with the result.

It is only in the summer that the light wines are largely consumed in this country, and then a combination of circumstances is against those of Australia.

The Continental wines are very cheap, they are well known, and they are greatly favored by the French treaty. Light claret, which is thought good enough for ordinary consumption in the London clubs, can be had

for 15s. per dozen, while the Australian wine is from 30s. to 40s. per dozen. I have no doubt whatever that it is far better than the cheap Continental wines; but until you can confidently say that all the Australian wine offered may be relied on for evenness of flavor and quality, it will be impossible to secure its general acceptance.

You must not be disappointed if you do not receive a report of the samples sent home for some time afterwards. It would be most injudicious to ask for opinions upon them until they are quite fit for trial, and it may be necessary to keep them for some time to make them so. Some of the best Australian wine I have ever seen is that produced by Mr. Francis at Sunbury. Some of this wine reached me some time ago, and Messrs. Bligh and Harbottle, through whom I received it, and who are excellent judges, advised that it should not be opened for at least a year.

I will not, however, trust to my own opinion as to this, although I am sure that it would be well to wait until summer. The difference between the same wine tasted in summer and in winter is so great as to seem like a difference in kind; and as Australian wines will be mostly consumed in the hot weather, I think it will be expedient to put off our trial until then.

I have already suggested to the Honorable the Chief Secretary that a joint application from the Australian Governments to the Chancellor of the Exchequer, upon the duties now imposed on Australian wines, might have some effect; at present the scale operates against Australia and in favor of France.

I have, &c.,

(Signed) GEO. F. VERDON,
Agent-General.

John Orr, Esq., Chairman of Wine Committee,
Board of Agriculture, Melbourne.

No. 16.

Sir, Chief Secretary's Office, 3rd January 1871.

With reference to my letter of 6th ultimo (No. 3326), regarding the samples of wine about to be forwarded to you by the Board of Agriculture, I have the honor to transmit a further letter (2nd January 1871) from Mr. Orr,* enclosing a bill of lading for the wine, list of samples, and other particulars.

* Mr. Orr's letter and enclosures will be in the office of the Agent-General, in London.

You will observe that Mr. Orr makes allusion to the fact of the Board of Agriculture having been dissolved by Act of Parliament passed during the recent session. The experiment need not in any way be influenced by that circumstance.

I have, &c.,

(Signed) W. H. ODGERS,

George Verdon, Esq., C.B., &c. For the Chief Secretary.

1955 | 71. 8 Victoria Chambers, Victoria street,

Sir, Westminster, S.W., 24th February 1871.

I have the honor to acknowledge the receipt of your despatch of the 3rd of January (No. 16), enclosing a letter from the Chairman of the Wine Committee of the Board of Agriculture and a bill of lading for forty-three (43) cases of Australian wine forwarded by the *Loch Ness*.

Upon the arrival of the wine, I will take steps to have it tested as soon as it is fit, and inform you of the result.

I have, &c.,

GEO. VERDON,

Agent General.

The Honorable the Chief Secretary, Melbourne.

Note.—I am informed by Sir George Verdon, K.C.M.G., that the whole quantity shipped was not delivered, some having been lost or stolen on board the ship. By far the greater portion landed was in bad condition and unfit to drink ; and scarcely any of the corks were good. The wine having arrived in winter, it was thought prudent not to have it tested in cold weather ; moreover, it having been deemed desirable to give the wine time to clear, it was cellared in the docks for some months. Arrangements were made subsequently to have the wine judged in France and Germany by committees of the most experienced wine tasters. These committees, however, refused to receive more than a certain limited quantity, and Sir George Verdon was therefore obliged to send as good a selection as he was able to make from such of the wine as was then in a fit condition for tasting. Samples were also distributed in London amongst wine merchants and others qualified to judge of their character and value. The rest remained in London, at the Agent-General's disposal, and Sir George had intended to give samples to the Refreshment Rooms Committee of the House of Commons and to some of the clubs as the wine got into condition. Sir George Verdon has kindly furnished the above information from memory, having nothing here to guide him. It will be observed that no instructions were issued as to the disposal of the wine, consequently Sir George Verdon was left to do the best he could with it.—A. R. W.

No. 2911. Chief Secretary's Office,
Sir, Melbourne, 14th August 1872.

Referring to my letter to your predecessor of the 6th December 1870, and his reply of the 24th February 1871, I have the honor to request that you will be good enough to inform me, at your earliest convenience, what steps, if any, have been taken towards testing the quality of the colonial wines forwarded to Sir George Verdon by the *Loch Ness*.

I have, &c.,

(Signed) J. G. FRANCIS.

The Right Honorable Hugh C. E. Childers, M.P.,
Agent-General for Victoria, London.

8245 | 72. 8 Victoria Chambers, Victoria street,
Sir, Westminster, S.W., 4th October 1872.

I have the honor to acknowledge the receipt of your despatch of the 14th of August (No. 2911), requesting me to inform you what steps have been taken towards testing the quality of the colonial wines forwarded to Sir George Verdon by the Board of Agriculture in 1871.

I beg to enclose the reports on these wines by gentlemen named in the margin.

Dr. Buhl.
Baron Dael von Koeth.
Mr. F. Seyler.

Sir George Verdon informed me, in reference to this subject, that, believing the opinions of English wine merchants would not be so trustworthy or satisfactory as those of the growers and judges of wine in Germany and France, he had determined in the first instance to take the opinions of competent judges in the Rhine country and in the French wine trade, and that he had opened communications accordingly. He added that it was his intention, as soon as the reports in question came in, to forward them to you, with a request that they might be made public if such a course should be approved. I resolved to await the arrival of those reports before taking any further steps in the matter.

The interesting and suggestive report from the syndic of the Paris wine trade, which M. Oscar Schmidt has procured, only reached this office on the 12th of last month. You will observe that M. Schmidt promises a further report from the syndic of the wine trade at Barbezieux.

Chambre Syndicale des Vins de Paris, by M. O. Schmidt.

I propose to have a careful examination made of the samples still remaining in stock, a case of which, lately tested by Mr. Leishman, of

the firm of Leishman and Inglis, of this city, seemed to have somewhat suffered, and I will then further report to you on the subject.

I have, &c.,

HUGH C. E. CHILDERS.

The Honorable the Chief Secretary,
Melbourne.

Examination of Australian Wines Exhibited at Melbourne in the Year 1870.*

In compliance with the request on the part of the Agent-General for Victoria, and upon the invitation of Freiherr Dael von Koeth, landowner at Sörgenbach, near Mainz, Messrs. Lanteren, brokers, Probet and Werner, wine merchants and proprietors at Mainz, met on the 2nd December 1871, in order to examine a series of wines which had been exhibited at the United Colonial Exhibition of Wines at Melbourne last year, and to report on the result of their examination.

The wines were the growth partly of the colony of Victoria, partly of the English colonies in Australia in general, and of the vintages of 1862–64 and 1866–70. In the subjoined enumeration the same order is followed as in the list of samples sent with the wines. (*See* under sections.)

The undersigned has drawn up this report in the critical examination and classification of the above wines, and, as a guarantee for its correctness, has signed the same at Mainz, on the 2nd December 1871.

(Signed) FEHR DAEL VON KOETH.

The above prices are enumerated in francs, and calculated per hectolitre of twenty-two English gallons. As to the characteristics of the wines, I refer to the specified report of Mr. F. Seyler, which we have agreed to jointly, and which for this reason I have signed with him.

The treatment of the wines in the cellars after fermentation must have been a careful one, as they do not show any sign of faults caused by defective casks. The pressing of the white wines appears to have been managed with equal care, as only one of the samples has turned rough by standing too long on the grapes. The color of all the light red wines, however, is very bad. These wines have either to remain longer on the grapes, or the selection of the quality of grapes may have been injudicious, as they have not color enough. The white wines are not clear enough, according to European notions ; they have either been bottled too early, or they have not been racked frequently enough in the casks. The

* Translated from the German.

most valuable wines by far are the full red wines, and some of the full-bodied white ones, *i.e.*, those approaching the character of the wines produced in the south of France and in Spain. It ought to be noticed, however, that they possess a much higher value for exportation, as those of France and Spain are exceedingly dear in the countries in which they are produced. In order to meet successfully the competition in the European markets the light red and white wines would have to be very cheap. The white wines, which could be compared to our German wines, are deficient in the particular flavor (bouquet) which constitutes their specialty and accords them their higher value. The red wines are produced exceedingly cheap in the South of France.

Concluding, from the character of the samples I have tasted, I would recommend the cultivation of German wines, particularly of the reisling, less than that of the Spanish grapes, supposing, of course, that these different qualities are grown under equal climatic influences. If, on the other hand, however, the wine-growing districts are situated in different latitudes, the German grapes would have to be restricted to the temperate districts, whilst the Spanish, the vines of the south of France, would have to be cultivated in the hot districts.

As to the great number of unsound wines, I would recommend the application of the process invented for the preservation of wines by Professor M. Pasteur, of Paris. The wines, after having passed through the process of fermentation, *i.e.*, the light wines at the age of one year, the full-bodied wines later, are brought to a temperature of 55·60° Celcins, and thereby rendered absolutely durable. All the vegetable particles originating the fermentation, and all the diseases of wines, are destroyed by this process. I have applied it to our very durable German wines for many years with the very greatest success. The process is described in the pamphlet, "Le Vin," par M. Pasteur, Paris.

(Signed) Dr. F. A. BUHL,
Member of the German Reichstag.

Deidesheim, 18th January 1872.

In confirming by my signature the above report on several samples of Australian wine, submitted to me by Dr. F. A. Buhl, I beg to acknowledge freely that the collection, and more particularly that part of it which equals in quality the Southern French and Spanish wines, includes many samples of a very excellent growth. In attempting, however, to produce qualities like our German Rhine wines, especially the reisling, the growers appear to meet with more difficulties.

I give this my opinion with all reserve, resting the same of course upon the assumption that all the samples I have tasted represent nothing but the pure product of nature.

Deidesheim, Rhenish Palatinate, January 1872.

(Official Seal.)

(Signed) FRED. SEYLER.
(Signed) Dr. F. A. BUHL,
Member of the German Parliament.

(Copy.)

Translation.

REPORT

Of Messrs. L. Célérier, President of the Chamber of Commerce of Wine Merchants, Paris ; Allain, nephew, Secretary ; and Mathiew, Treasurer of that Chamber, of a certain number of samples of Red and White Wines, presented by M. Oscar Schmidt, under the auspices of Mr. George Verdon, Agent-General of the Colony of Victoria (Australia) in London.

Report of Wines, *see* sections

Paris, 4th May 1872.

The present report is certified to as true by the undersigned, President of the Chamber of Commerce of the Wholesale Wine and Spirit Merchants of the Department of the Seine.

(Official Seal.) (Signed) L. CÉLÉRIER.

GENERAL REMARKS.

Report of M. Oscar Schmidt, Paris.

The Halle aux Vins consists of a series of sheds and vaults, covering many acres of enclosed ground, under bond ; these are occupied by over 6000 wholesale wine and spirit merchants, who have a regularly organized official board or chamber, with a president at its head ; to him matters of dispute and subjects interesting the trade generally are submitted.

Beside the president, secretary, and treasurer, other influential members of the trade attended the test of the Victorian wines. The produce being new to them, and not brought under their notice as a regular article of trade, it was difficult to establish a proper basis upon which to form a judgment. This induced the president to assimilate them, as far as possible, to wines produced in France as current articles of trade, which bore a resemblance to the samples submitted.

Independently of the official report, I have obtained additional information from a competent judge who attended the test, which I herewith beg to submit, trusting that some of the suggestions may prove useful to the grower.

The fiery wines from the south require, on account of their nature, more care for their proper preservation than the milder, cooler wines of Bordeaux. All wines, however, whatever may be their origin, require the following treatment :—

When, after crushing, the wine has been racked off from the vats into casks, it should always be aired by means of a vent-hole near the bung, so as to avoid fermentation ; if this is omitted the fermentation would warp or explode the cask, and waste its contents. Here the airing lasts several months, and at every sign of fermentation it is racked off. By this means it is refreshed, and loses the taste of fermentation.

All wines are racked off regularly twice a year, even if they have not fermented, and more frequently if fermentation has set in. At the end of the first year, the wine being racked off, if it is not clear it should be clarified, as stated, with the white of eggs and aired. As soon as it is clear it should be very carefully racked off into another cask, which should be completely filled and stacked, with the bung turned on one side, so as always to be saturated by the wine, and thus prevent evaporation.

If the wine is kept for several years, it should still be racked off regularly twice a year, in spring and autumn, and the cask filled up each time. The racking, when properly performed, should of course be stopped immediately the wine ceases to run clear, so as not to mix any lees or other sediment with the clear wine. Should clarified wine not be clear at the end of a month or six weeks, and fermentation have set in, it would require to appease it to be racked off again, although thick, a small piece of sulphured fuse to be burned inside the empty cask, the clarifying process repeated, stacked without shaking it, and aired and racked off when perfectly clear.

All casks should, before being used, be well rinsed with water, and all the water allowed to run off. Any water left in the cask would impart a musty taste to the wine. Should the cask be old and dry, it should be soaked in water before use, and be well saturated, so as to avoid the wine tasting sour.

Paris, 30th August 1872.

(Signed) OSCAR SCHMIDT,
11 Rue Abbatucci.

P.S.—Should any further information be required, I shall have much pleasure in obtaining it, as far as it may lie in my power.

(Sig.) O. S.

9301 | 72. 8 Victoria Chambers, Victoria street,
Sir, Westminster S.W., 31st December 1872.

In continuation of my letter of the 4th of October (No. 8245), I have the honor to inform you that, with a view to obtain a thoroughly exhaustive and reliable report on the colonial wines forwarded to Sir George Verdon last year by the Board of Agriculture, I caused Dr. Thudichum, the author of the well known treatise on wines (of which I forwarded a copy for your information at the time of its publication), to be consulted on the subject. Dr. Thudichum is well aware of the importance which attaches to the development of certain special characteristics of the Australian wines, and he believes that in time, and with the exercise of that degree of care which attends the cultivation and fermentation of the grape in the best districts of France and Germany, a great trade in these wines may be produced. For such a report as I contemplated, which, he said, would involve many careful analyses and a thorough study of the whole question, his fee would be Two hundred pounds (£200). The sum appropriated by the Government for analyses, and for the other expenses connected with those cases of wine, was Fifty pounds (£50), a considerable part of which I find has been expended. I can only, therefore, refer the proposal to the consideration of the Government.

I have, &c.,
HUGH C. E. CHILDERS.

The Honorable the Chief Secretary,
Melbourne.

627 | 73. 8 Victoria Chambers, Victoria street,
Sir, Westminster S.W., 21st February 1873.

M.O.Schmidt and the President, Halle aux Vins, Paris.

In compliance with the directions contained in your despatch (No. 21), of the 3rd of January last, I will transmit to the gentlemen whose names appear in the margin the letters of thanks which you have been good enough to forward, for their reports on the Australian wine delivered to Sir George Verdon.

I have, &c.,
(Signed) JAMES McCULLOCH.

The Honorable the Chief Secretary,
Melbourne.

No. 4. Chief Secretary's Office,
Sir, Melbourne, 3rd January 1873.

I have much pleasure in thanking you, on behalf of the Government of Victoria, for your efforts in obtaining the interesting and suggestive report on Victorian wines which you transmitted to the Agent-General in London, and which that gentleman has forwarded to me.

It will indeed prove most useful to the vine-growing interest in Australia.

Acting upon the hint contained in your letter to the Honorable Sir George Verdon of the 3rd of October 1871, I have addressed to the President of the Halle aux Vins in Paris a letter conveying to him the thanks of this Government for the time and pains, evidently considerable, which he has devoted to this matter.

I have, &c.,
J. G. FRANCIS.

No. 3. Chief Secretary's Office,
Sir, Melbourne, 3rd January 1873.

I have the honor to acknowledge the receipt (through the Agent-General of this colony in London) of your interesting and suggestive report on Australian wines which were exhibited at the United Colonial Exhibition of Wines held at Melbourne in 1870, and were subsequently submitted to your judgment.

I have much pleasure in conveying to you the very cordial thanks of this Government for the time and pains which you have devoted to the examination.

The value of your report to the vine-growing interest not only in Victoria but in all the colonies of Australia cannot be over estimated.

It has long been desired to obtain an impartial and authoritative opinion on Australian wines, and your report fully realizes that desideratum.

I have, &c.,

J. G. FRANCIS.

The President of the Halle aux Vins, Paris.

SIR, 11 Rue Abbatucci, Paris, 8th March 1873.

I have the honor of acknowledging receipt of your letter of the 3rd of January last, conveying the thanks of the Government of Victoria for my efforts in obtaining a report on the Australian wines submitted to the Board of the Halle aux Vins.

It has given me much pleasure to have been able to prove useful on this occasion, and I shall always be happy to exert myself in the interest of the colony of Victoria, whose prosperity has no more sincere admirer than—

Your most obedient servant,

OSCAR SCHMIDT.

To the Honorable the Chief Secretary of Victoria,
Melbourne.

INTERCOLONIAL WINE EXHIBITION, 1870.

TABLE showing the Name of Exhibitor, the Class, the Number of Sections that each Exhibitor competed in, Total Number of Exhibits of each Competitor, and the Locality.

Name of Exhibitor.	Class A, Sections 1 to 10. Open to Victorian Wines only.										Class B, Sections 11 to 15. Open to the Australian Colonies.					Total Number of Exhibits.	Locality.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.		
Best, Joseph	1	1	1	1	...	1	1	1	1	1	1	...	...	...	...	10	Great Western ... Victoria.
Blackburn, George ...	...	2	...	...	...	...	...	...	...	...	...	1	...	...	...	3	Boroondara ... „
Brown Brothers	...	1	...	1	...	1	...	2	...	...	...	...	...	...	...	5	Wahgunyah ... „
Bruhn, Ernest	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	Sandhurst ... „
Clark, Walter	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	2	Glenara, Bulla ... „
Davies, John	...	1	...	1	...	2	...	...	...	...	...	...	...	...	...	4	Moonee Ponds ... „
Dardell, J. H.	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	2	Batesford ... „
Daniel, Charles	...	...	...	2	...	...	...	2	...	...	...	...	...	...	...	4	Bulla ... ... „
Deppeler, Jacob	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	2	Gheringhap ... „
Deschamp, Louis	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	2	Yering ... „
Doyle, James	...	...	...	...	...	...	...	...	...	...	...	2	2	2	...	6	Lochinvar ... New South Wales.
Everest, T. J.	...	...	2	...	...	...	1	...	...	...	...	...	3	...	...	6	Hawthorn ... Victoria.
Elliott, S.	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	Brighton ... „
Fisher, Daniel	...	...	...	...	...	...	...	...	...	...	2	2	2	...	...	6	Norwood ... South Australia.
Giles, Charles	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	2	Maude ... Victoria.
Gillard, Joseph	...	...	...	...	...	...	...	...	...	...	2	...	...	...	1	3	Norwood ... South Australia.
Grosse, Frederick	1	2	...	...	1	1	1	1	...	...	1	1	...	...	...	9	Strathfieldsaye ... Victoria.
Greig, Alexander	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	2	Gumeracka ... South Australia.
Greene, William	...	...	...	...	...	...	...	...	...	...	1	1	...	1	...	3	Angaston ... „
Guscetti, Frederick ...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	2	Newbridge ... Victoria.
Hardy, Thomas	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	Adelaide ... South Australia.
Heine and Greiffenhagen ...	1	3	1	1	1	1	...	...	...	1	1	1	1	...	1	13	Strathfieldsaye ... Victoria.
Hirsche, Frederick	...	...	...	...	...	1	...	...	1	2	...	...	...	...	1	5	Castlemaine ... „
Heine, August	1	...	1	1	...	1	1	1	...	1	...	...	1	1	1	10	Sandhurst ... „
Hope, R. C.	1	1	...	...	...	...	1	1	...	...	...	...	...	...	...	4	Batesford ... „

Holmes, S. H. ...	...	...	...	...	...	...	...	...	...	...	...	3	3	...	...	5	11	Lochinvar ...	New South Wales.
Ind, G. F. ...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	2	Paradise Vineyard ...	South Australia
Jacob, William ...	...	...	...	...	...	...	...	...	...	...	...	2	4	...	...	...	6	Norwood ...	„
Jung, Otto ...	...	1	1	1	1	2	1	2	1	1	1	1	2	1	2	2	20	Castlemaine ...	Victoria.
Jures, H.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	3	Shenthall ...	South Australia.
Knight, Northcote ...	...	...	1	...	...	...	...	1	1	...	...	...	...	...	...	...	3	Maude ...	Victoria.
Knight, Page ...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	3	Maude ...	„
Maplestone, Charles ...	...	...	1	1	...	...	1	1	...	...	...	...	...	1	...	...	5	Ivanhoe, Heidelberg	„
Merle, Jean ...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1	Glenlyon ...	„
Meredith, Thomas ...	...	1	1	...	...	...	1	1	1	...	...	1	...	1	1	...	8	Chewton ...	„
Murray, Andrew ...	...	1	1	1	...	...	...	...	...	...	...	1	...	...	...	...	4	Balwyn, Boroondara	„
Muchleback, Xaver ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	Maude ...	„
Nadenbousch, Alphonse ...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	2	Batesford ...	„
Peake, E. J. ...	...	...	...	...	...	...	...	...	...	...	...	2	5	1	2	1	11	Clarendon ...	South Australia.
Penefold, Mary ...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	...	3	Adelaide ...	„
Phelps, R. L. ...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	3	Albury	New South Wales.
Pohl, Carl	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	Sandhurst ...	Victoria.
Rau, Henry	...	...	...	...	...	...	...	...	...	...	...	1	1	...	1	...	3	Albury	New South Wales.
Randall, David ...	...	...	...	...	...	...	...	...	...	...	...	3	1	5	2	2	13	Seacombe ...	South Australia.
Shroeder, E. ...	...	1	...	...	...	1	...	...	...	1	...	1	1	1	1	...	7	Castlemaine ...	Victoria.
Schneider, Jacob ...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	2	Nunawading ...	„
Schmitt, Franz ...	...	...	...	...	...	2	1	...	...	...	...	...	2	...	...	...	5	Berwick	„
Smith, G. S. ...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	Wahgunyah ...	„
Stevenson, R. and J. ...	...	2	...	...	...	...	...	...	1	...	...	...	...	...	...	...	3	Kangaroo Ground...	„
Trowette and Blampied ...	1	1	1	1	1	1	1	1	1	...	1	1	1	1	1	14	Great Western ...	„
Weber Brothers	1	1	1	...	1	...	1	...	...	...	...	1	1	1	1	...	9	Geelong ...	„
Weber, Abraham ...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	Moorabool River ...	„
Wyndham, Messrs....	...	...	...	...	...	...	...	...	...	...	...	7	6	3	1	1	18	Dalwood	New South Wales.
White, George ...	...	...	...	...	...	...	...	...	...	...	...	2	4	2	6	...	14	Fullarton ...	South Australia.
Totals ...	...	14	24	11	13	12	17	12	17	6	6	40	44	29	25	19	289		

54 Exhibitors.

Victorian Exhibits	179
South Australian Exhibits	69
New South Wales Exhibits	41
Total	289

Number of Samples sent to the Agent-General to be reported upon by Foreign Judges	196
Number reported upon up to the present time	94

INTERCOLONIAL WINE EXHIBITION, 1870.—

THE following is a tabulated Statement, compiled from the Declarations of the Com- two classes, divided

CLASS A.—VICTORIAN WINES.

Section.	Description of Wine.	First Prize.	Second Prize.
1	Full-bodied Red Wine, any vintage	£8	£4
2	Full-bodied Red Wine, not older than 1868 ...	6	4
3	Light Red Wine, any vintage	8	4
4	Light Red Wine, not older than 1868	6	4
5	Full-bodied White Wine, any vintage	8	4
6	Full-bodied White Wine, not older than 1868 ...	6	4
7	Light White Wine, any age	8	4
8	Light White Wine, not older than 1868 ...	6	4
9	Red Sweet or Liqueur Wine	6	4
10	White Sweet or Liqueur Wine	6	4

The table gives the Number as placed on Bottle, the Names of Exhibitors, the Localities where grown, the Nature of Soil, How Cultivated, whether Vines are trained to Stakes or otherwise, the Awards of the Victorian and the Report of the German Judges.

CLASS A, SECTION 1.—VICTORIAN WINES.—FULL-BODIED RED WINE,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
	1	E. Schroeder	Castlemaine ..	Two-thirds Hermitage, one-third Black Cluster	Red Imperial ..
3	* 2	Weber Brothers ..	Geelong ..	Hermitage ..	Hermitage ..
2	* 3	Fredk. Grosse ..	Strathfieldsaye..	Seyras, or Hermitage	Ditto .. ..
2	* 4	R. C. Hope	Batesford ..	Hermitage ..	Ditto .. ..
3	* 5	Heine and Greiffenhagen	Strathfieldsaye ..	Ditto	Ditto .. ..
	6	Thos. Meredith ..	Chewton ..	Ditto	Ditto .. ..
§ 3	* 7	Andw. Murray ..	Boroondara ..	Chiefly Hermitage	Balwyn ..
§ 3	* 8	Trowette and Blampied	Great Western ..	Hermitage ..	Hermitage ..
2	* 9	Joseph Best	Ditto	Red Muscat ..	Red Muscat ..
§ 3	* 10	August Heine ..	Sandhurst ..	Hermitage ..	Hermitage ..
§ 1	* 11	Xaver Muchleback ..	Maude ..	Ditto	Hermitage or Shyraz
§ 3	* 12	Ditto	Ditto	Ditto	Ditto .. ..
§ 3	* 13	Carl Pohl	Sandhurst ..	Carbinet Sauvignon and Hermitage	Carbinet & Hermitage
	14	Otto Jung	Castlemaine ..	Hermitage ..	Hermitage ..
3	* 15	Northcote Knight ..	Maude ..	Ditto	Ditto .. ..

Report of M. Oscar Schmidt, Paris.

Class A, Section 1.—Red Wine, 1869, No. 13.—Good wine, and being capable of taking the place of Bordeaux wine, should be judiciously treated.

Report of M. L. Célérier, President of the Chamber of Commerce of the Wholesale Wine and Spirit Merchants of the Department of the Seine.

Red Wine.—Class A.—Wines of the Australian Colonies.—Section 1, Red Wine, 1869, No. 13.—High in color, but thick. Its present state of fermentation renders it difficult to appreciate. It seems, nevertheless, capable of keeping well, and would be worth about 100 fr. per hectolitre (£4 per 22 galls.). This wine promises well for the future.

Report of Dr. F. A. Buhl, Member of the German Parliament.

Class A.—Victorian Wines.—Section 1, No. 7.—Burgundy, not cultivated long enough; too young. Value, 48 fr.

Section 1, No. 10.—Ropy in bottle. Without valuation.

Section 1, No. 12.—Rousillon, well cultivated. 42 fr.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 7, 8, 10, 11, 12, and 13.

HELD BY THE BOARD OF AGRICULTURE OF VICTORIA.

petitors for the Prizes offered by the Board of Agriculture for Wines in the following into sixteen sections, viz.:—

CLASS B.—OPEN TO THE AUSTRALIAN COLONIES.

Section.	Description of Wine.	First Prize.	Second Prize.
11	Full-bodied Red Wine, any vintage	£12	£6
12	Full-bodied White Wine, any vintage	12	6
13	Light-Red Wine, any vintage	12	6
14	Light White Wine, any vintage	12	6
15	Sweet or Liqueur Wine, any vintage	8	4
16	For the sample of Wine which, in the opinion of the judges, has the greatest number of points of merit	10	...

Names of Grapes from which wine was made, the Name of Wine, the Date of Vintage, the Age of Vines, the Judges, the Number of Bottles of each Exhibit sent to the Agent-General, the Report of the French Judges,

ANY VINTAGE.—FIRST PRIZE, £8; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1867	4	Clay and rocks	By hand	Stakes, 4 ft. x 4 ft.	7
1866	10	Sandy loam and limestone ..	Ditto	Stakes ..	5
1868	4	Light loam, gravel; subsoil red friable clay	Ditto	Ditto	5
1865	9	Rich black soil	Plough	Ditto	5
1867	4	Sand, red clay subsoil ..	By hand	Ditto	6
1867	4	Clay, slate, and sandstone ..	Ditto	Ditto	7
1867	6 to 9	Light gravelly	Plough and horse-hoe	Bush	3
1867	4 to 9	Gravel, sand, and clay ..	Ditto	Stakes ..	3
1869	5 to 7	Ditto	Ditto	Ditto	3
1870	3	Red loam, slate, and sandstone rock	Ditto	Trellised ..	6
1869	7	Rich volcanic or limestone ..	By hand	Stakes ..	7
1870	8	Ditto	Ditto	Ditto	First prize.
1869	6	Red clay	Plough	Ditto	Second prize.
1868	8	Red clay, gravel, slate, black surface soil	By hand	Ditto	Hon. mention.
1870	..	Rotten quartz, limestone, and loam	.. .. ..	.. ..	Too late, but sent to England.

Report of Herr Freiherr Dael von Koeth.

Class A.—Victorian Wines.—Section 1, No. 8, Vintage 1867.—A very good red wine, of muscatel flavor.

Section 1, No. 10, Vintage 1870.—Red wine, out of condition, and therefore not to be considered.

Section 1, No. 11, Vintage 1869.—An excellent red wine, similar to the Rousillon wines, but dry of taste.

Report of Herr Fred. Seyler.

Class A.—Victorian Wines.—Section 1, No. 7 Vintage 1866.—A fine, pure-tasting, promising wine; character of the better Burgundies.

Section 1, No. 10, Vintage 1866.—Unsound, and therefore not worthy of notice.

Section 1, No. 12, Vintage 1866.—A useful wine, in the style of the Rousillons, sweet and full.

Note.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION, 1870.—

CLASS A, SECTION 2.—VICTORIAN WINES.—FULL-BODIED RED WINE,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
	1	John Davies ..	Moonee Ponds ..	Shiraz	Red, No. 1 ..
	2	Weber Brothers ..	Geelong	Hermitage ..	Hermitage ..
§ 3	* 3	Fredk. Grosse ..	Strathfieldsaye ..	Carbinet Sauvignon	Carbinet ..
§ 3	* 4	Ditto	Ditto	Shiraz or Hermitage	Hermitage ..
§ 3	* 5	R. C. Hope.. ..	Batesford ..	Hermitage ..	Ditto .. ..
§ 3	* 6	Heine & Greiffenhagen	Strathfieldsaye ..	Ditto	Ditto .. ..
	7	Ditto	Ditto	Ditto	Ditto .. ..
§ 3	* 8	Ditto	Ditto	Carbinet Sauvignon	CarbinetSauvignon
§ 3	* 9	S. Elliott	Brighton.. ..	Mataro and others	Red Burnham ..
	10	Thos. Meredith ..	Chewton.. ..	Hermitage ..	Hermitage ..
	11	Fredk. Guscetti ..	Newbridge ..	Malaga	Malaga ..
§ 3	* 12	Andrew Murray ..	Boroondara ..	Carbinet and Mataro	Balwyn ..
§ 3	* 13	Geo. Blackburn ..	Ditto	Hermitage and Burgundy	Hermitage ..
3	* 14	Ditto	Ditto	Hermitage ..	Ditto .. ..
3	* 15	Trowette & Blampied	Great Western ..	Ditto	Ditto .. ..
3	* 16	Joseph Best ..	Ditto	Ditto	Ditto .. ..
	17	J. H. Dardell ..	Batesford ..	Ditto	Ditto .. ..
	* 18	Jacob Schneider ..	Nunawading .	Ditto	Ditto .. ..
	* 19	Brown Brothers ..	Wahgunyah ..	Shiraz	Shiraz.. ..
	* 20	Carl Pohl	Sandhurst ..	Hermitage ..	Hermitage ..
	21	R. and J. Stevenson	Kangaroo Ground	Ditto	Ditto .. ..
	22	Ditto	Ditto	Ditto	Ditto .. ..
3	* 23	Otto Jung	Castlemaine ..	Ditto	Ditto .. ..
3	* 24	Northcote Knight ..	Maude	Ditto	Ditto .. ..

Report of Dr. F. A. Buhl.

Section 2, No. 3.—Narbonne, small Bordeaux, well cultivated, 40 f.

Section 2, No. 5.—Spanish wine sherry, Tarragona, well cultivated, 200 f.

Section 2, No. 8.—Narbonne, small Bordeaux, well cultivated, 50 f.

Section 2, No. 12.—Bad, or completely out of condition; without valuation.

Report of Herr Freiherr Dael von Koeth.

Section 2, No. 4, Vintage 1869.—Beautiful red wine, Burgundy like.

Section 2, No. 6, Vintage 1868.—Excellent red wine, Burgundy character. Better than the last number.

Section 2, No. 9, Vintage 1869.—Very good red wine, taste of Burgundy. Wine inferior to the last number.

Section 2, No. 13, Vintage 1868.—Red wine, in character like claret. Unfortunately it has a corky taste.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 3, 4, 5, 6, 8, 9, 12, and 13.

STATEMENT—*continued.*

NOT OLDER THAN 1868.—FIRST PRIZE, £6; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1869	6	Volcanic and gravelly ..	Plough	Stakes and 2 wires	Not exhibited.
1868	12	Sandy loam and limestone ..	By hand	Stakes.. ..	Not exhibited.
1869	5	Light loam and gravel ..	Ditto	Ditto	1
1869	5	Ditto	Ditto	Ditto	7
1868	7	Rich black soil	Plough	Ditto	7
1868	5	Sand, clay subsoil	By hand	Ditto	6
1869	6	Ditto	Ditto	Ditto	Not exhibited.
1869	5	Ditto	Ditto	Ditto	6
1869	3 to 9	Sand, gravel, clay subsoil ..	Plough	Bush	7
1868	5	Clay, slate, and sandstone ..	By hand	Stakes.. ..	7
1870	10	Sandy black loam	Ditto	Trellised ..	Older than 1870.
1868	6 to 9	Light gravelly	Plough and horse-hoe	Mostly unstaked	7
1868	3	Red sandy loam, marly clay, and gravel	Ditto	Bush	8; hon. mention.
1869	3	Ditto	Ditto	Ditto	8; hon. mention.
1869	4 to 9	Gravel, sand, and clay ..	Ditto	Ditto	4
1869	5 to 7	Ditto	Ditto	Ditto	3
1870	5	Black	By hand	Stakes.. ..	1
1869	9	Clayish	Ditto	Ditto	8; hon. mention.
1869	6	Sandy soil	Plough	Ditto	2
1869	6	Red clay	Ditto	Ditto	First prize.
1869	5	Sandy loam	By hand	Ditto	5
1870	6	Ditto	Ditto	Ditto	6
1869	8	Red clay, gravel, slate, and black surface soil	Ditto	Ditto	Second prize.
1868	..	Quartz, limestone, and loam..	.. .. ..	.. ..	Not exhibited; sent to England.

Report of Herr Fred. Seyler.

Section 2, No. 3, Vintage 1869.—A good wine in quality, like the wines growing in the south of France, near Narbonne.

Section 2, No. 5, Vintage 1868.—Very good quality; character highly appreciated; Tarragona wines, valuable.

Section 2, No. 8, Vintage 1869.—Fine wine of the style of the Narbonne, but of a superior quality still (approaching the claret).

Section 2, No. 12, Vintage 1868.—Out of condition, and therefore not worthy of notice.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS A, SECTION 3.—VICTORIAN WINES.—LIGHT RED WINE,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
§ 3	* 1	Charles Giles ..	Maude	Miller's Burgundy	Burgundy ..
	2	Weber Brothers ..	Geelong	Burgundy ..	Ditto .. ..
§ 3	* 3	T. J. Everest ..	Hawthorn ..	Mataro	Mataro ..
§ 3	* 4	Ditto	Ditto	Ditto	Ditto .. ..
§ 3	* 5	Heine & Greiffenhagen	Strathfieldsaye ..	Burgundy ..	Burgundy ..
3	* 6	Trowette & Blampied	Great Western ..	Ditto	Ditto .. ..
	7	Joseph Best ..	Ditto	Carbinet Sauvignon, Malvoisia,& Malbec	Malvoisia ..
3	* 8	August Heine ..	Sandhurst ..	Mataro	Mataro ..
3	* 9	Andrew Murray ..	Boroondara ..	Carbinet and Mataro	Balwyn ..
	10	Charles Maplestone	Heidelberg ..	Hermitage ..	Red Ivanhoe ..
	11	Otto Jung	Castlemaine ..	Hermitage, Cluster, and Mataro	.. ..

Report of Dr. F. A. Buhl.

Section 3, No. 1.—Light German red wine, bad color, 20 f.

Section 3, No. 3.—Quite unsound; without valuation.

Report of Herr Freiherr Dael von Koeth.

Section 3, No. 4, Vintage 1862.—White pressed red wine, as it is produced in Lorraine, and more particularly in the neighborhood of Metz.

Section 3, No. 5, Vintage 1868.—The same remark applicable.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 1, 3, 4, and 5.

CLASS A, SECTION 4.—VICTORIAN WINES.—LIGHT RED WINE,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
	1	John Davies ..	Moonee Ponds ..	Shiraz and Mataro	Red No. 2 ..
§ 3	* 2	Charles Giles ..	Maude	Miller's Burgundy	Burgundy ..
§ 3	* 3	Heine & Greiffenhagen	Strathfieldsaye ..	Malbec	Malbec ..
§ 3	* 4	Trowette & Blampied	Great Western ..	Burgundy ..	Burgundy ..
3	* 5	Joseph Best ..	Ditto	Burgundy&Grenache	Ditto .. ..
§ 3	* 6	Jean Merle ..	Glenlyon ..	Gamai Vines ..	Gamai ..
3	* 7	Charles Daniel ..	Bulla	Frontignac, Pineau Nois, Grenache, and Mataro	Red Wine ..
§ 3	* 8	Ditto	Ditto	Ditto	Ditto .. ..
§ 3	* 9	August Heine ..	Sandhurst ..	Mataro	Mataro ..
3	* 10	Walter Clark ..	Glenara, Bulla ..	Ditto	Ditto .. ..
3	* 11	Brown Brothers ..	Wahgunyah ..	Brown Muscatel ..	Brown Muscatel
3	* 12	Charles Maplestone	Heidelberg ..	Hermitage&Grenache	Red Ivanhoe ..
3	* 13	Otto Jung	Castlemaine ..	Cluster	.. ..

Report of Dr. F. A. Buhl.

Section 4, No. 2.—Light German red wine, bad color, 20 f.

Section 4, No. 3.—Poor, almost unsound, without color, 30 f.

Section 4, No. 4.—Out of condition, without color.

Report of Herr Freiherr Dael von Koeth.

Section 4, No. 6, Vintage 1870.—This red wine is somewhat green of taste, and being too young, and not fully matured, ought not to have been bottled yet.

Section 4, No. 8, Vintage 1870.—Good red wine, as it is produced in the south of France, more particularly in the environs of Narbonne.

Section 4, No. 9, Vintage 1868.—Pleasant red wine, claret like.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 2, 3, 4, 6, 8, and 9.

1870.—STATEMENT—*continued.*

ANY VINTAGE.—FIRST PRIZE, £8; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1869	4	Gravelly, sandy quartz ..	Plough	Stakes.. ..	7
1866	10	Sandy loam and limestone ..	By hand	Ditto	5
1863	6	Gravelly and sandy ..	Dug and scarified ..	Ditto	5
1862	6	Ditto	Ditto	Ditto	5
1868	6	Sand, red clay subsoil ..	By hand, 2 to 3 feet..	Ditto	3
1867	4 to 9	Gravel, sand, and clay ..	Plough	Ditto	5
1869	5 to 7	Ditto	Plough	Ditto	Not exhibited.
1867	10	Red loam, slate, and sandstone	By hand, 18 inches ..	Ditto	Second prize.
1867	6 to 9	Light gravelly	Plough and horse-hoe	Bush	3
1866	5	Sandy loam	Plough and hand labor	Trellised ..	Frist prize.
1868	8	Red clay, gravel, slate, and black surface soil	By hand	Stakes ..	8; hon.mention.

Report of Herr Fred. Seyler.

Section 3, No. 1, Vintage 1869.—A light wine, good.
Section 3, No. 3, Vintage 1863.—Of an inferior taste.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

NOT OLDER THAN 1868.—FIRST PRIZE, £6; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1868	6 and 7	Volcanic and gravelly ..	Plough and hand labor	Stakes and 2 wires	5
1869	4	Gravelly, sandy quartz ..	Plough	Stakes.. ..	4
1869	5	Sand, clay subsoil	By hand, 2 to 3 feet	Ditto	5
1869	4 to 9	Gravel, sand, and clay ..	Plough	Ditto	7
1869	5 to 7	Ditto	Ditto	Ditto	9; hon.mention.
1870	12	Chocolate	By hand	Ditto	Second prize.
1869	3,4 and 5	Decomposed granite, iron-stone, dry and sandy	Plough and horse-hoe	Bush	4
1870	4,5 and 6	Ditto	Ditto	Ditto	8; hon.mention.
1868	10	Red loam, slate, and sandstone rock	By hand, 18 inches ..	Stakes.. ..	First prize.
1868	7	Slightly volcanic	Ditto	Ditto	3
1869	6	Sandy loam	Plough	Ditto	2
1868	7	Ditto	Plough and horse-hoe	Trellis.. ..	6
1869	9	Red clay, gravel, slate, and black surface soil	By hand	Stakes.. ..	Not a light wine —disqualified.

Report of Herr Fred. Seyler.

Section 4, No. 2, Vintage 1869.—A light wine as well, but decidedly superior to the preceding two numbers, *i.e.*, Nos. 1 and 3, section 3.
Section 4, No. 3, Vintage 1869.—Somewhat better still.
Section 4, No. 4, Vintage 1869.—Little color, little value.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS A, SECTION 5.—VICTORIAN WINES.—FULL-BODIED WHITE

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
	1	E. Schroeder ..	Castlemaine ..	Black Hermitage pressed white	White Imperial ..
§ 3	* 2	Jacob Dappeler ..	Gheringhap ..	Chasselas ..	Chasselas ..
	3	Franz Schmitt ..	Berwick ..	Reisling or Hock ..	Reisling or Hock
	4	Ditto	Ditto	Ditto	Ditto .. ..
	5	Weber Brothers ..	Geelong	Reisling	Reisling ..
§ 2	* 6	Fredk. Grosse ..	Strathfieldsaye ..	Verdeilho ..	Verdeilho ..
§ 3	* 7	Heine & Greiffenhagen	Ditto	Ditto	Ditto .. ..
§ 3	* 8	Abraham Weber ..	Moorabool River ..	Chasselas ..	Chasselas ..
3	* 9	Trowette & Blampied	Great Western ..	Ditto	Ditto .. ..
3	* 10	A. Nadenbousch ..	Batesford ..	Ditto	Ditto .. ..
	12	Otto Jung ..	Castlemaine ..	Reisling	Reisling ..
	13	Ditto	Ditto	Vendage ..	..

Report of M. Oscar Schmidt.

White Wines.—Class A.—Victorian Wines.—Section 5, White Wine. 1868, No. 6.—The care which should have been bestowed upon this sample may be stated as follows :—To get it clear it should have been racked off twice a year, viz., at the beginning of spring and at the commencement of autumn. In case this double racking off did not give the wine the required brightness and limpidity, it would have to be clarified by means of the white of four eggs to each cask of 200 litres (44 gallons). This operation once performed, it should be allowed to rest for a fortnight or three weeks, being aired all the time by means of a small vent-hole driven through the cask near the bung. At the end of that time it should be racked off.

Report of M. L. Célérier.

White Wines.—Class A.—Victorian Wines.—Section 5, White Wine, 1868, No. 6.—This sample is thick. It seems to be the produce of younger vines, and also of a year less favorable to the grape. It seems likewise capable of keeping for many years. It is probable that it would improve considerably if judiciously treated. It may be compared to the wines of the south of France. Its commercial value cannot be estimated, owing to its unsound state.

CLASS A, SECTION 6.—VICTORIAN WINES.—FULL-BODIED WHITE WINE,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
	1	John Davies ..	Moonee Ponds ..	Unknown ..	White No. 1 ..
	2	Ditto	Ditto	Ditto	Ditto .. ..
§ 3	* 3	Jacob Dappeler ..	Gheringhap ..	Chasselas ..	Chasselas ..
	4	Franz Schmitt ..	Berwick	Reisling	Reisling ..
§ 3	* 5	Fredk. Grosse ..	Strathfieldsaye ..	Verdeilho ..	Verdeilho ..
§ 3	* 6	Heine & Greiffenhagen	Ditto	Ditto	Ditto .. ..
	7	Thos. Meredith ..	Chewton ..	Chasselas ..	Chasselas ..
	8	Fredk. Guscetti ..	Newbridge ..	Reisling	Reisling ..
§ 3	* 9	Trowette & Blampied	Great Western ..	Chasselas ..	Chasselas ..
	10	Joseph Best ..	Ditto	Reisling & Verdeilho	Reisling ..
	11	J. H. Dardell ..	Batesford ..	Chasselas ..	Chasselas ..
3	* 12	Jacob Schneider ..	Nunawading ..	Reisling	Reisling ..
3	* 13	A. Nadenbousch ..	Batesford ..	Ditto	Ditto .. ..
	14	Fredk. Hirsche ..	Castlemaine ..	Chasselas ..	Hirsche's Chasselas ..
3	* 15	August Heine ..	Sandhurst ..	Madeir aand Sweet-water	
3	* 16	Brown Brothers ..	Wahgunyah ..	Reisling	Reisling ..
3	* 17	Otto Jung	Castlemaine ..	Ditto	Ditto .. ..

Report of Dr. F. A. Buhl.

Section 6, No. 3.—Sauterne, badly cultivated, 80 *f.*
Section 6, No. 5.—Sauterne, too much tartar, 60 *f.*

Report of Herr Freiherr Dael von Koeth.

Section 6, No. 6, Vintage 1869.—Quite out of condition, and unsound.
Section 6, No. 9, Vintage 1868.—White wine, in taste like hock, and with a muscatel flavor.

1870.—STATEMENT—*continued.*

WINE, ANY VINTAGE.—FIRST PRIZE, £8; SECOND PRIZE, £5.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1867	4	Clay and rocks	By hand	Stakes, 4 x 4 feet	7
1868	8	Chocolate and limestone ..	Ditto	Stakes ..	First prize.
1866	6	Chocolate and black clay ..	Ditto	Ditto	4
1867	7	Ditto	Ditto	Ditto	4
1866	10	Sandy loam and limestone ..	Ditto	Ditto	4
1868	4	Light loam and gravel ..	Ditto, 18 to 30 inches	Ditto	5
1868	4	Sand, clay subsoil	Ditto, 2 to 3 feet ..	Ditto	Second prize.
1870	8	Clayish, limestone bottom ..	By hand	Ditto	7
1867	4 to 9	Gravel, sand, and clay ..	Plough	Ditto	7
1870	10	Sand, clay subsoil	Ditto	Ditto	6
1868	8	Red clay, gravel, slate, and black surface soil	By hand	Ditto	7
1869	8	Ditto	Ditto	Ditto	7

Report of Dr. F. A. Buhl.

Section 5, No. 2.—Picardon (Cette), badly cultivated, 30 f.

Section 5, No. 6.—Small Sauterne, badly cultivated, 60 f.

Report of Herr Freiherr Dael von Koeth.

Section 5, No. 7, Vintage 1868.—Very good spirituous white wine, very similar to the so-called "leisten or stein wine" grown near Wurzburg.

Section 5, No. 8, Vintage 1870.—This white wine comes near to Rhenish (p. hock) wine, but has an earthy taste.

Report of Herr Fred. Seyler.

Section 5, No. 2, Vintage 1868.—Rather sweet and full, still a light wine; turned cloudy in bottle.

Section 5, No. 6, Vintage 1868.—Turned cloudy likewise, but still a pure-tasting wine of very fine quality.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 2, 6, 7, and 8.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

NOT OLDER THAN 1868.—FIRST PRIZE, £6; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1868	7	Volcanic and gravelly ..	Horse and hand labor	Stakes and 2 wires	7
1869	7	Ditto	Ditto	Ditto	7
1868	8	Chocolate and lime	By hand	Stakes ..	Second prize.
1868	8	Chocolate and black clay ..	Ditto	Ditto	2
1869	4	Light loam and gravel ..	Trenched 18 to 30 in.	Ditto	5
1869	5	Sand, clay subsoil	By hand, 2 to 3 feet	Ditto	5
1868	5	Clay, slate, and sandstone ..	Ditto	Ditto	3
1870	10	Sandy black loam	Ditto	Trellised ..	1
1868	4 to 9	Gravel, sand, and clay ..	Plough	Stakes ..	7
1869	5 to 7	Ditto	Ditto	Ditto	Not exhibited.
1870	5	Black	By hand, 4 feet apart	Ditto	Not exhibited.
1869	6	Clayish	By hand	Ditto	5
1870	10	Sand, clay subsoil	By horse & hand labor	Ditto	7
1869	13	Yellow clay and slate ..	4 x 4 feet	Ditto	7
1869	8	Red loam, slate, and sandstone rock	By hand, 18 inches ..	Ditto	First prize
1869	6	Sandy soil	Plough	Ditto	3
1869	8	Red clay, gravel, slate, and black surface soil	By hand	Ditto	8; hon. mention.

Report of Herr Fred. Seyler.

Section 6, No. 3, Vintage 1868.—A full-bodied wine, character of the Sauterne, valuable.
Section 6, No. 5, Vintage 1868.—Good quality, but too dry (rough in taste).

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 3, 5, 6, and 9.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS A, SECTION 7.—VICTORIAN WINES.—LIGHT WHITE WINE,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
2	* 1	Northcote Knight ..	Maude	Pineau Blanc ..	Pineau White ..
	2	Weber Brothers ..	Geelong	Ditto	Pineau Blanc ..
	3	Fredk. Grosse ..	Strathfieldsaye ..	Shepherd's Reisling	Reisling ..
1	* 4	R. C. Hope ..	Batesford ..	Reisling	Ditto .. ..
3	* 5	T. J. Everest ..	Hawthorn ..	Verdeilho and Pineau Blanc	Verdeilho ..
	6	Thos. Meredith ..	Chewton ..	Verdeilho and Gouy	Hock .. ..
3	* 7	Trowette & Blampied	Great Western ..	White Nice ..	Nice Blanc ..
	8	Joseph Best ..	Ditto	Chasselas & Tokay	Chasselas ..
3	* 9	August Heine ..	Sandhurst ..	Chasselas, Sweetwater, & Traminer	.. ..
	10	Charles Maplestone..	Heidelberg ..	Shepherd's and German Reisling	White Ivanhoe
	11	Otto Jung	Castlemaine ..	Rousette ..	.. ..
	12	Ditto	Ditto	Chasselas ..	.. ..

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.

CLASS A, SECTION 8.—VICTORIAN WINES.—LIGHT WHITE WINE,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
§ 3	* 1	Northcote Knight ..	Maude	Pineau Blanc ..	Pineau White ..
§ 3	* 2	Fredk. Grosse ..	Strathfieldsaye ..	Shepherd's Reisling	Reisling ..
§ 3	* 3	Louis Deschamp ..	Yering	Chasselas ..	Chasselas ..
§ 3	* 4	Ditto	Ditto	Tokay	Tokay ..
§ 3	* 5	R. C. Hope ..	Batesford ..	Reisling	Reisling ..
	6	Thos. Meredith ..	Chewton ..	Tokay	Tokay ..
§ 3	* 7	Trowette & Blampied	Great Western ..	White Nice and Reisling	Reisling ..
3	* 8	Joseph Best ..	Ditto	Pineau Blanc and White Hermitage	Pineau Blanc ..
3	* 9	Brown Brothers ..	Wahgunyah ..	Aucorat and Tokey	Quondong White
3	* 10	Ditto	Ditto	Aucorat	Ditto ..
3	* 11	Charles Daniel ..	Bulla	Chasselas, Pineau Blanc, Xeres, and Gouais mixed	White Wine ..
3	* 12	Ditto	Ditto	Ditto	Ditto .. ..
3	* 13	August Heine ..	Sandhurst ..	Pedro Ximenes and Sweetwater	.. ..
3	* 14	Walter Clark ..	Glenara, Bulla ..	Pineau Blanc ..	.. ..
3	*‡ 15	Charles Maplestone..	Heidelberg ..	Shepherd's and German Reisling	White Ivanhoe..
	16	R. and J. Stevenson	Kangaroo Ground	Tokay	Tokay ..
3	* 17	Otto Jung ..	Castlemaine ..	Rousette ..	.. ..

Report of Dr. F. A. Buhl.

Section 8, No. 1.—German geuve, poor growth, 30 f.

Section 8, No. 3.—German geuve, Reisling, 80 f.

Section 8, No. 5.—Small sherry, badly cultivated, 90 f.

Report of Herr Freiherr Dael von Koeth.

Section 8, No. 2, Vintage 1869.—A very nice white wine, with plenty of strength, which surpasses in this respect even the Rhenish wines. Value, about £65 per 260 imperial gallons.

Section 8, No. 4, Vintage 1870.—A Reisling wine, similar to Rhenish wines, of a beautiful bouquet. Higher value than the number before this.

Section 8, No. 7, Vintage 1869.—Muscatel taste, but sick, and therefore not to be considered.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 1, 2, 3, 4, 5, and 7.

1870.—STATEMENT—*continued.*

ANY AGE.—FIRST PRIZE, £8; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1868	5	Light sandy limestone ..	Plough	Stakes ..	3
1867	11	Sandy loam and limestone ..	By hand	Ditto	3
1868	4	Light loam and gravel ..	By hand, 18 to 30 in.	Ditto	First prize.
1865	9	Rich black soil	Plough	Ditto	9; second prize.
1867	6	Gravelly and sandy ..	Dug and scarified ..	Ditto	4
1865	6	Gravel and shale	By hand	Ditto	8; hon. mention.
1867	4 to 9	Gravel, sand, and clay ..	Plough	Ditto	7
1869	5 to 7	Ditto	Ditto	Ditto	Not exhibited.
1867	10	Red loam, slate, and sandstone rock	By hand, 18 inches ..	Ditto	4
1865	4	Sandy loam	Plough and horse-hoe	Trellised ..	5
1868	8	Red clay, gravel, slate, and black surface soil	By hand	Stakes ..	5
1869	9	.. ..	Ditto	Ditto	6

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

NOT OLDER THAN 1868.—FIRST PRIZE, £6; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1869	6	Light sandy limestone ..	Plough	Stakes ..	5
1869	5	Light loam and gravel ..	Trenched, 18 to 30 in.	Ditto	5
1870	1 to 4	Light loamy	Plough, 18 inches ..	Ditto	8; hon. mention.
1870	1 to 4	Ditto	Ditto	Ditto	8; hon. mention.
1868	7	Rich black soil	Plough	Ditto	Second prize.
1869	5	Clay, slate, and sandstone ..	By hand	Ditto	8; hon. mention.
1869	4 to 9	Gravel, sand, and clay ..	Plough	Ditto	5
1869	5 to 7	Ditto	Ditto	Ditto	9; hon. mention.
1869	7	Sandy loam	Ditto	Ditto	2
1869	7	Ditto	Ditto	Ditto	2
1869	3, 4, 5	Decomposed granite, ironstone, dry and sandy	Plough and horse-hoe	Bush	4
1870	4, 5, 6	Ditto	Ditto	Ditto	3
1868	7	Red loam, slate, and sandstone rock	By hand	Stakes ..	4
1868	7	Deep loam	Ditto	Ditto	4
1868	7	Sandy loam	Plough and horse-hoe	Trellised ..	‡ First prize.
1870	7	Ditto	By hand	Stakes ..	6
1869	8	Clay, gravel, slate, black surface soil	Ditto	Ditto	8; hon. mention.

Report of Herr Fred. Seyler.

Section 8, No. 1, Vintage 1868.—Small and poor, without much value.
Section 8, No. 3, Vintage 1868.—Fine quality, approaching our German Reisling wines; rather valuable.
Section 8, No. 5, Vintage 1868.—Something like sherry, good quality, in taste, however, not pleasing, and therefore difficult to be valued.

‡ This exhibit also took the prize of £10 for the sample of wine which in the opinion of the judges had the greatest number of points of merit.
NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS A, SECTION 9.—VICTORIAN WINES.—RED, SWEET, OR

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
§ 2	* 1	E. Schroeder ..	Castlemaine ..	Black and White Hermitage	Frontignac ..
	2	Trowette & Blampied	Great Western ..	Mixture of grapes	Liqueur Wine ..
	3	Joseph Best ..	Ditto	Ditto	Ditto .. ..
	4	Fredk. Hirsche ..	Castlemaine ..	Hermitage ..	Ditto .. ..
§ 3	* 5	G. S. Smith ..	Wahgunyah ..	Dark-brown Muscatel	Muscatel ..
	6	Otto Jung	Castlemaine ..	Cluster	.. ..

Report of Dr. F. A. Buhl.

Section 9, No. 1.—Out of condition.

Report of Herr Freiherr Dael von Koeth.

Section 9, No. 5, Vintage 1869.—Sweet nice wine, the color of which is a blend between white and red, and reminding one of Cyprus wines.

Report of Herr Fred. Seyler.

Section 9, No. 1, Vintage 1868.—Turned sour in bottle, and therefore not worth reporting upon.

CLASS A, SECTION 10.—VICTORIAN WINES.—WHITE, SWEET,

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
	1	Heine and Greiffenhagen	Strathfieldsaye ..	Frontignac ..	Frontignac ..
	2	Joseph Best ..	Great Western ..	Mixture of grapes	Liqueur Wine ..
	3	Fredk. Hirsche ..	Castlemaine ..	Chasselas & Muscat	Muscat Lunel ..
	4	Ditto	Ditto	Chasselas ..	Unfermented Wine
§ 3	* 5	August Heine ..	Sandhurst ..	Muscat Blanc ..	.. ..
	6	Otto Jung	Castlemaine ..	Chasselas ..	.. ..

Report of Dr. F. A. Buhl.

Section 10, No. 5.—Southern France muscat, 100 f.

Report of Herr Freiherr Dael von Koeth.

Section 10, No. 5, Vintage 1869.—Round and soft, and with a taste of dry muscat lunel. Being an excellent wine, its probable value may be £90 per 260 imperial gallons.

Report of Herr Fred. Seyler.

Section 10, No. 5, Vintage 1868.—A sweet and exceedingly aromatic wine, of fine quality and rather high value.

1870.—STATEMENT—*continued.*

LIQUEUR WINE.—FIRST PRIZE, £6; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1867	4	Clay and rocks	By hand	Stakes, 4 by 4 feet	Second prize.
1867	4 to 9	Gravel, sand, and clay ..	Plough	Ditto	1
1869	5 to 7	Ditto	Ditto	Ditto	2
1867	13	Yellow clay and slate ..	4 by 4 feet ..	Ditto	6
1869	5	Light sandy loam	Plough	Bush	First prize.
1868	8	Red clay, gravel, slate, and black surface soil	By hand	Stakes ..	4

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.

Samples marked thus (§) reported upon by foreign judges, viz., Nos. 1 and 5.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

OR LIQUEUR WINES.—FIRST PRIZE, £6; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1868	5	Sand, clay subsoil	By hand, 2 to 3 feet	Stakes ..	Second prize.
1869	5 to 7	Sand, gravel, and clay ..	Plough	Ditto	
1867	13	Yellow clay and slate ..	4 by 4 feet apart ..	Ditto	
1870	13	Ditto	Ditto	Ditto	
1869	11	Red loam, slate, and sandstone rock	By hand, 18 inches	Ditto	First prize.
1868	9	Red clay, gravel, slate, black surface soil	Ditto	Ditto	Hon. mention.

NOTE.—An asterisk (*) is attached to the number sent to the Agent-General.

Sample marked thus (§) reported upon by foreign judges, viz., No. 5.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS B, SECTION 11.—OPEN TO THE AUSTRALIAN COLONIES.—FULL-BODIED

No. of Bottles of each Exhibit sent to the Agent-General for further Report	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
3	* 1	William Jacob ..	Mowowo, S.A. ..	Shiraz	Shiraz ..
§ 3	* 2	Ditto	Ditto	Carbinet	Carbinet ..
§ 2	* 3	Henry Rau ..	Albury, N.S.W. ..	Burgundy	Burgundy ..
	4	Messrs. Wyndham ..	Dalwood, N.S.W...	Verdôt	Bukkulla Red ..
	5	Ditto	Ditto	Hermitage	Ditto ..
	6	Ditto	Ditto	Hermitage and Malbec ..	Ditto ..
	7	Ditto	Ditto	Black Spanish.. ..	Ditto ..
1	* 8	Ditto	Ditto	Hermitage	Ditto ..
§ 1	* 9	Ditto	Ditto	Ditto	Ditto ..
§ 1	* 10	Ditto	Ditto	Ditto	Dalwood Red ..
	11	E. Schroeder ..	Castlemaine ..	Hermitage	Hermitage ..
§ 3	* 12	Alex. Greig ..	Gumeracka, S.A. ..	Shiraz	Greig's Shiraz
§ 3	* 13	E. J. Peake ..	Clarendon, S.A. ..	Black Portugal ..	Clarendon Red
§ 3	* 14	Ditto	Ditto	Ditto	Ditto ..
3	* 15	Weber Brothers ..	Geelong	Hermitage	Hermitage ..
	16	Fredk. Grosse ..	Strathfieldsaye ..	Shiraz or Hermitage ..	Ditto ..
3	* 17	Heine & Greiffenhagen	Ditto	Hermitage	Ditto ..
	18	Thos. Meredith ..	Chewton ..	Ditto	Ditto ..
§ 3	* 19	Andrew Murray ..	Boroondara ..	Carbinet and Mataro ..	Balwyn ..
§ 1	* 20	David Randall ..	Seacombe, S.A. ..	Shiraz and Carbinet ..	Red .. ..
1	* 21	Ditto	Ditto	Carbinet	Ditto ..
3	* 22	Ditto	Ditto	Shiraz, Carbinet, & Mataro	Ditto ..
3	* 23	Trowette & Blampied	Great Western ..	Hermitage	Hermitage ..
	24	Joseph Best ..	Ditto	Hermitage, Carrignon, and others	Ditto ..
3	* 25	Joseph Gillard ..	Norwood, S.A. ..	Shiraz	Ditto ..
3	* 26	Ditto	Ditto	Two-thirds Mataro, one-third Shiraz	Port character
§ 1	* 27	Daniel Fisher ..	Ditto	Shiraz and Mataro ..	Fisher's Dry Port
2	* 28	Ditto	Ditto	Mataro, Grenache, Portugal	Roussillon ..
§ 2	* 29	S. H. Holmes ..	Lochinvar, N.S.W.	Red Hermitage ..	Red Hermitage
	30	Ditto	Ditto	Ditto	Ditto ..
3	* 31	Ditto	Ditto	Ditto	Ditto ..
3	* 32	George White ..	Fullarton, S.A. ..	Molor Negro	Molor Negro ..
	33	Ditto	Ditto	Ditto	Ditto ..
2	* 34	Mary Penefold ..	Adelaide, S.A. ..	Mataro & Black Portugal	No. 3 Red ..
1	* 35	Wm. Greene ..	Angaston, S.A. ..	Shiraz	Shiraz ..
§ 2	* 36	G. F. Ind	Paradise Vineyard, S.A.	Shiraz and Mataro ..	Paradise Red ..
3	* 37	Ernest Bruhn ..	Sandhurst ..	Carbinet Sauvignon ..	Carbinet ..
	38	Otto Jung	Castlemaine ..	Hermitage	Hermitage ..
2	* 39	R. L. Phelps ..	Albury, N.S.W. ..	Malbec	Malbec ..
2	* 40	Mary Penefold ..	Adelaide, S.A. ..	Grenache, Mataro, & Black Portugal	Grange Red ..
3	* 41	George Blackburn ..	Boroondara ..	Miller's Burgundy with 10 per ct. Black Hermitage	Burgundy ..

Report of M. Oscar Schmidt, Paris.

Section 11, No. 2.—Very good wine; the French wines from the Côte Rotie, with which it is compared, are much liked here, and drunk as light dessert wines. This wine would fully repay the trouble of careful management.

Section 11, No. 36.—The wine from the Eastern Pyrenees, which the sample resembles, is not considered of great value here, and is chiefly used for mixing.

Report of M. L. Célérier.

Section 11, No. 2.—A very good wine, unfortunately thick, seems to be capable of keeping for a length of time, and may be compared to the wines of the Câte du Rhône, called Côte Rotie; may be worth 150 francs per hectolitre (£6 per 22 gallons). The vineyard which produces this wine promises a very successful future.

Section 11, No. 36.—Rather light in color; is thick, which impairs its quality. It has much analogy with certain sweet wines of the south of France (Department of the Eastern Pyrenees). It represents actually a value of 85 francs per hectolitre (£3 8s. per 22 gallons) at the vineyard, and appears capable of keeping a long time.

Report of Dr. F. A. Buhl.

Section 11, No. 2.—Asmannhauser, best cultivated, 180 francs.

Section 11, No. 3.—Tokay, bad color, 80 francs.

Section 11, No. 20.—Burgundy, well cultivated.

Section 11, No. 27.—Out of condition.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.

Samples marked thus (§) reported upon by foreign judges, viz., Nos. 2, 3, 9, 10, 12, 13, 14, 19, 20, 27, 29, and 36.

1870.—STATEMENT—*continued.*

RED WINE, ANY VINTAGE.—FIRST PRIZE, £12; SECOND PRIZE, £6.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1867	8	Sandy loam	Plough	Stakes	4
1868	8	Ditto	Ditto	Ditto	5
1869	5	Red clay	By hand	Ditto	5
1868	9	Red loam, very rich, globules of lime and ironstone gravel at bottom	Plough, horse-hoe, and hand-hoe	Trellised	9; hon. mention.
1868	9	Ditto	Ditto	Ditto	8; hon. mention.
1867	9	Ditto	Ditto	Ditto	7
1868	9	Ditto	Ditto	Ditto	7
1867	9	Ditto	Ditto	Ditto	7
1866	9	Ditto	Ditto	Ditto	4
1866	16	Ditto	Ditto	Ditto	4
1866	3	Clay and rocks	By hand	Stakes, 4 x 4 feet	6
1867	6 & 12	Sand, clay, and quartz	Ditto	Stakes and bush	5
1864	12	Rich red marl on rotten slate	Spur pruned	Bush	4
1864	12	Ditto	Ditto	Ditto	7
1866	10	Sandy loam and limestone	By hand	Stakes	6
1867	3	Light loam and gravel	Trenched 18 to 30 inches	Ditto	First prize.
1868	5	Sand, clay subsoil	By hand, 2 to 3 feet	Ditto	7
1866	6	Clay	Ditto	Ditto	4
1866	6 to 9	Light gravelly	Plough and horse-hoe	Mostly unstaked	3
1864	4	Sandy loam, rock, gravelly and clay	By hand and animal	Stakes	7
1862	5	Ditto	Ditto	Ditto	6
1869	8	Ditto	Ditto	Ditto	Second prize.
1867	4 to 9	Gravel, sand, and clay	Plough	Ditto	3
1869	5 to 7	Ditto	Ditto	Ditto	Not exhibited.
1868	12	Red clay, limestone bottom	Pruned with short spurs	Ditto	4
1865	12	Ditto	with long shoots down to 2 eyes	Bush	2
1865	12	Red loam, limestone bottom	Digging and pruning only	Stakes	5
1865	12	Ditto	Ditto	Ditto	3
1867	2½	Red marl ridge, magnesian-limestone subsoil	Plough and scarifier	Stakes, 1 wire 3 feet from ground	3
1868-9	3 & 4½	Ditto	Ditto	Ditto	8; hon. mention.
1869	4½	Ditto	Ditto	Ditto	6
1865	9	Red loam, gravelly bottom	7 feet square	Stakes	3
1865	9	Ditto	Ditto	Ditto	Not exhibited.
1867	5	Chocolate, limestone bottom	Horse labor principally	Stakes, 8 x 8 feet	3
1860	12	Red, with lime and ironstone	Plough	Bush, short pruned	3
1867	10	Sandy loam		Bush	1
1870	8	Red clay	Plough	Stakes	7
1868	8	Red clay, gravel, slate, black surface soil	By hand	Ditto	7
1868	4	Red clay	Plough	Ditto	3
1868	6	Chocolate, limestone bottom	Horse labor	Stakes, 8 x 8 feet	5
1869	4	Red sandy loam, substratum of marly clay and gravel	Plough, scarifier, and hoe	Bush	†

Report of Herr Freiherr Dael von Koeth.

Section 11, No. 9.—Very good red wine, Burgundy like.

Section 11, No. 10.—Dry red wine, claret like.

Section 11, No. 12.—This red wine has all the qualities of the wines from the south of France.

Section 11, No. 13.—A very good white wine, very much like a dry Cape wine, but at the same time reminding one of Marsala wine, and of the wine enumerated under section 12, No. 13.

Section 11, No. 14.—Same remark as to section 11, No. 12, but this No. 14 is better.

Section 11, No. 19.—The remark to section 11, No. 12, applies likewise to this wine; is inferior to No. 14.

Section 11, No. 29.—The same remark as to No. 13.

Report of Herr Fred. Seyler.

Section 11, No. 2, Vintage 1868.—An excellent red wine in the style of our fine German red wines, cultivated with care; rather high value.

Section 11, No. 3, Vintage 1868.—Like our Scheller wines (blending between white and red), full bodied, and reminding one of Tokay.

Section 11, No. 20.—A well conserved fine red wine, mild and sound; of considerable value.

Section 11, No. 27.—Appears to have been sweet; suffered, however, much in bottle, and therefore difficult to be reported upon.

† This sample was wrongly entered in section 12, but transferred to this section for the purpose of being sent to England.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS B, SECTION 12.—OPEN TO THE AUSTRALIAN COLONIES.—

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle.	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
§ 3	* 1	William Jacob ..	Norwood, S.A. ..	Reisling ..	Reisling ..
3	* 2	Ditto	Ditto	Pedro Ximenes & 3 others	White Spanish ..
§ 3	* 3	Ditto	Ditto	Reisling ..	Reisling ..
3	* 4	Ditto	Ditto	Verdeilho ..	Verdeilho ..
§ 1	* 5	Henry Rau ..	Albury, N.S.W. ..	Reisling ..	Reisling ..
	6	Messrs. Wyndham ..	Dalwood, N.S.W.	Madeira ..	Dalwood White
1	* 7	Ditto	Ditto	Ditto	Bukkulla White
§ 1	* 8	Ditto	Ditto	Shiraz and Reisling	Ditto .. ..
	9	Ditto	Ditto	Madeira	Ditto .. ..
	10	Ditto	Ditto	Shiraz and Sherry	Ditto .. ..
	11	Ditto	Ditto	Shiraz	Ditto .. ..
	12	E. Schroeder ..	Castlemaine ..	White Hermitage	White Hermitage
§ 3	* 13	E. J. Peake ..	Clarendon, S.A. ..	Temperano ..	Temperano ..
§ 3	* 14	Ditto	Ditto	Ditto	Ditto .. ..
§ 3	* 15	Ditto	Ditto	Muscatel ..	Muscatel ..
§ 3	* 16	Ditto	Ditto	Palomino Blanco & Pedro Ximenes	Clarendon White
3	* 17	Ditto	Ditto	Verdeilho ..	Verdeilho ..
	18	Franz Schmitt ..	Berwick ..	Reisling ..	Reisling ..
	19	Ditto	Ditto	Ditto	Ditto .. ..
	20	Weber Brothers ..	Geelong ..	Ditto	Ditto .. ..
§ 2	* 21	Fredk. Grosse ..	Strathfieldsaye ..	Verdeilho ..	Verdeilho ..
	22	Page Knight ..	Maude	Ditto	Ditto .. ..
	23	Heine & Greiffenhagen	Strathfieldsaye ..	Ditto	Ditto .. ..
§ 3	* 24	David Randall ..	Seacombe, S.A. ..	Reisling, Tokay, & Verdeilho	White ..
	25	Geo. Blackburn ..	Boroondara ..	Miller's Burgundy and Hermitage	Burgundy ..
§ 3	* 26	Trowette & Blampied	Great Western ..	Chasselas ..	Chasselas ..
§ 2	* 27	Daniel Fisher ..	Norwood, S.A. ..	Muscatel ..	Muscat ..
§ 2	* 28	Ditto	Ditto	Muscatel & Verdeilho	Fisher's Sherry
§ 2	* 29	James Doyle ..	Lochinvar, N.S.W.	Muscatel ..	Muscatel ..
2	* 30	Ditto	Ditto	Tokay & Verdeilho	Kalondah White
§ 2	* 31	S. H. Holmes ..	Ditto	Shiraz & Verdeilho	Shiraz & Verdeilho
§ 1	* 32	Ditto	Ditto	Shiraz	Shiraz ..
2	* 33	Ditto	Ditto	Verdeilho ..	Verdeilho ..
3	* 34	George White ..	Fullarton, S.A. ..	Temperano Blanco	Temperano ..
§ 3	* 35	Ditto	Ditto	Ditto	Ditto .. ..
3	* 36	Ditto	Ditto	Pedro Ximenes & Palomino Blanco	Pedro Ximenes..
	37	Ditto	Ditto	Doradilla ..	Doradilla ..
2	* 38	William Greene ..	Angaston, S.A. ..	Pineau	Pineau .. ..
2	* 39	G. F. Ind	Paradise Vineyard, S.A.	Pedro Ximenes ..	Paradise White
	40	Otto Jung	Castlemaine ..	Reisling and Gouais	.. .. ..
	41	Ditto	Ditto	Vendage & Chasselas	.. .. ..
2	* 42	R. L. Phelps ..	Albury, N.S.W. ..	Reisling	Reisling ..
2	* 43	Ditto	Ditto	Verdeilho and White Shiraz	Valverde ..
	44	Mary Penefold ..	Adelaide, S.A. ..	Grenache, Mataro, & Black Portugal	Frontignac (D. R.

Report of M. Oscar Schmidt.

Section 12, No. 14.—Same remarks as for the preceding sample, *i.e.*, Section 5, No. 6.

Report of M. L. Célérier.

Section 12, No. 14.—Sample thick, of a yellowish color, rather darker than the last, seems to be of the same origin. Same observations as for the last, *i.e.*, section 5, No. 6.

Report of Herr Freiherr Dael von Koeth.

Section 12, No. 1.—A full-bodied spirituous white wine, quite of the style of Rhenish (hock) wines, but of more body and alcoholic strength; will freely fetch £75 per 260 imperial gallons.

Section 12, No. 3.—An elegant white wine, with good fragrance; resembles the Rhenish wines, but with more alcohol, and probably of the same value as the last number, *i.e.*, No. 1.

Section 12, No. 13.—Reminding one of Madeira, but is still more like the wines of Marsala.

Section 12, No. 16.—White and sweet, of Madeira-like taste.

Section 12, No. 24.—The same remark as to section 11, No. 13.

Section 12, No. 26.—The pronounced mouldy taste excludes any notice of this number.

Section 12, No. 28.—This white wine, being unsound and out of condition, does not require any notice.

Section 12, No. 29.—White wine of an astringent taste, which, however, one may still be inclined to take for a dry Spanish wine.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.

Samples marked thus (§) reported upon by foreign judges, viz., Nos. 1, 3, 5, 8, 13, 14, 15, 16, 21, 24, 26, 27, 28, 29, 31, 32, and 35.

1870.—STATEMENT—*continued.*

FULL-BODIED WHITE WINE, ANY VINTAGE.—FIRST PRIZE, £12; SECOND PRIZE, £6.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1867	8	Calcareous loam	Plough	Stakes	6
1867	8	Sandy loam	Ditto	Bush	6
1868	8	Calcareous loam	Ditto	Stakes	7
1868	8	Sandy loam	Ditto	Ditto	1
1867	11	Red clay	By hand	Ditto	8; hon. mention.
1869	12	Deep red sandy loam	Plough, horse & hand hoe	Trained on wire	7
1867	9	Red loam, very rich	Ditto	Ditto	9; second prize.
1866	9	Ditto	Ditto	Ditto	7
1868	9	Ditto	Ditto	Ditto	6
1868	9	Ditto	Ditto	Ditto	10; first prize.
1868	9	Ditto	Ditto	Ditto	7
1867	4	Clay and rocks	By hand	Stakes, 4 x 4	4
1867	12	Rich red marl on rotten slate	Spur pruned	Bush	2
1868	12	Ditto	Ditto	Ditto	4
1862	12	Ditto	Ditto	Ditto	3
1867	18	Ditto	Ditto	Ditto	2
1866	12	Ditto	Trelissed	Wire trellis	2
1866	6	Chocolate soil, clay subsoil	By hand	Stakes	3
1867	7	Ditto	Ditto	Ditto	3
1866	10	Sandy loam and limestone	Ditto	Ditto	7
1867	3	Light loam and gravel	Trenched 18 to 30 in.	Ditto	2
1867	4	Loam and rotten lime	By hand	Ditto	Not exhibited.
1868	4	Sand, clay subsoil	By hand, 2 to 3 feet	Ditto	4
1869	8	Sand, loam, gravelly rock, & clay	By hand and horse	Ditto	5
1869	4	Sand, loam, clay, and gravel	Plough	Bush	Disqualified; entered in wrong section.
1867	4 to 9	Gravel, sand, and clay	Ditto	Stakes	4
1866	8	Red loam, limestone bottom	Digging & pruning only	Ditto	4
1866	8	Ditto	Ditto	Ditto	4
1867	20	Sandy loam	Plough and harrow	Spur pruned	4
1867	20	Ditto	Ditto	Ditto	6
1867	2½	Red marl ridge, magnesian-limestone bottom	Ditto	Stakes & one wire	2
1867	2½	Ditto	Ditto	Ditto	7
1868	3½	Ditto	Ditto	Ditto	3
1865	9	Red loam, gravelly bottom	7 feet square	Stakes	3
1866	9	Ditto	Ditto	Ditto	7
1867	9	Ditto	Ditto	Ditto	6
1867	9	Ditto	Ditto	Ditto	Not exhibited.
1864	12 to 20	Sandy shale	Plough	Bush	4
1862	10	Sandy loam		Ditto	3
1868	8	Red clay, gravel, slate, black surface soil	By hand	Stakes	7
1869	8	Ditto	Ditto	Ditto	4
1868	4	Red clay	Plough	Ditto	5
1868	4	Ditto	Ditto	Ditto	5
1868	6	Chocolate, limestone bottom	Ditto	Ditto, 8 x 8	6

Report of Dr. F. A. Buhl.

Section 12, No. 5.—Pedro Ximenes (sherry for England), 180 f.

Section 12, No. 8.—Niersteiner Reisling, well cultivated, 120 f.

Section 12, No. 14.—Out of condition.

Section 12, No. 15.—Pedro Ximenes (sherry for England), 180 f.

Section 12, No. 21.—Unsound.

Section 12, No. 27.—Madeira, not matured, 300 f.

Section 12, No. 31.—Madeira; too young, badly cultivated, 200 f.

Section 12, No. 32.—Unsound.

Section 12, No. 35.—Sherry, very small, 90 f.

Report of Herr Fred. Seyler.

Section 12, No. 5.—Sherry like, of middling value; in taste, however, not particularly pleasing.

Section 12, No. 8.—Approaching our Reisling wines; fine, and very creditable.

Section 12, No. 14.—Has suffered very much in bottle, and therefore not worth reporting upon.

Section 12, No. 15.—Sherry like (fine wine); in taste, however, not pleasing.

Section 12, No. 21.—Turned sour in bottle.

Section 12, No. 27.—Not arrived at its full maturity, but a promising wine, in the style of the Madeira growth.

Section 12, No. 31.—A fine wine, approaching in character the preceding number; of an inferior quality, however.

Section 12, No. 32.—Has suffered too much to be reported upon.

Section 12, No. 35.—Character of the sherry, but poor in quality.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS B, SECTION 13.—OPEN TO THE AUSTRALIAN COLONIES.—LIGHT

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
§ 2	* 1	Messrs. Wyndham .	Dalwood, N.S.W.	Black Spanish Claret	Dalwood Red ..
2	* 2	Ditto	Ditto	Ditto	Ditto .. ..
2	* 3	Ditto	Ditto	Burgundy	Ditto .. ..
	4	E. Schroeder ..	Castlemaine ..	Black Cluster ..	Burgundy ..
§ 3	* 5	Alexander Greig ..	Gumeracka, S.A.	.. .. ..	Harvest Wine ..
3	* 6	E. J. Peake ..	Clarendon, S.A.	Grenache	Grenache ..
	7	Weber Brothers ..	Geelong ..	Burgundy	Burgundy ..
	8	Page Knight ..	Maude ..	Chasselas & Hermitage	Ruby .. ..
	9	Ditto	Ditto	Burgundy	Burgundy ..
3	* 10	T. J. Everest ..	Hawthorn ..	Mataro	Mataro ..
3	* 11	Ditto	Ditto	Donozalino & Carbinet	Canignon ..
3	* 12	Ditto	Ditto	Shiraz and Carbinet	Hermitage ..
§ 3	* 13	Heine & Greiffenhagen	Strathfieldsaye	Glory	Glory .. ..
	14	Thos. Meredith ..	Chewton ..	Mataro & Grenache..	Chewtonia ..
§ 1	* 15	David Randall ..	Seacombe, S.A...	Shiraz	Red .. ..
3	* 16	Ditto	Ditto	Shiraz, Carbinet, and Mataro	Ditto .. ..
§ 2	* 17	Ditto	Ditto	Shiraz and Carbinet	Ditto .. ..
§ 2	* 18	Ditto	Ditto	Carbinet	Ditto .. ..
2	* 19	Ditto	Ditto	Shiraz and Carbinet	Ditto .. ..
§ 3	* 20	Trowette & Blampied	Great Western ..	Black Cluster ..	Burgundy ..
§ 1	* 21	Daniel Fisher ..	Norwood, S.A. ..	Mataro and Portugal	Fisher's Light Port
2	* 22	Ditto	Ditto	Mataro and Shiraz ..	Ditto .. ..
2	* 23	James Doyle ..	Lochinvar, N.S.W.	Hermitage ..	Kalondah Red ..
§ 1	* 24	Ditto	Ditto	Laun Muscat ..	Ditto .. ..
§ 3	* 25	George White ..	Fullarton, S.A...	Molor Negro ..	Molor Negro ..
3	* 26	Ditto	Ditto	Ditto	Ditto .. ..
3	* 27	August Heine ..	Sandhurst ..	Mataro	Mataro ..
3	* 28	Charles Maplestone	Heidelberg ..	Hermitage	Red Ivanhoe ..
	29	Otto Jung	Castlemaine ..	Cluster	.. ..

Report of M. Oscar Schmidt.

Section 13, No. 25.—Better than the preceding sample, *i.e.*, section 11, No. 36; but to preserve it, it should be frequently and carefully racked off and aired, in order to prevent fermentation setting in.

Report of M. L. Célérier.

Section 13, No. 25.—Thick, and cannot be estimated on account of its state of fermentation. It seems to have some analogy with certain wines from the Côte du Rhône, and likely to keep pretty well if properly treated.

Report of Dr. F. A. Buhl.

Section 13, No. 15.—French vin ordinaire; bad color; 25 f.

Section 13, No. 18. — Impure, without color.

Section 13, No. 21.—Unsound.

Section 13, No. 24.—French vin ordinaire; bad color; 25 f.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.

Samples marked thus (§) reported upon by foreign judges, viz., Nos. 1, 5, 13, 15, 17, 18, 20, 21, 24, and 25.

1870.—STATEMENT—*continued.*

RED WINE, ANY VINTAGE.—FIRST PRIZE, £12; SECOND PRIZE, £6.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1866	12	Deep red sandy loam ..	Plough, horse-hoe, and hand-hoe	Trained on wire	4
1866	14	Ditto	Ditto	Ditto ..	6
1867	12	Ditto	Ditto	Ditto ..	5
1869	6	Clay and rocks	Trenched by hand ..	Stakes, 4 x 4 ..	4
1868	6 to 12	Sand, clay, and quartz ..	Ditto	Stakes and bush	2
1868	12	Red marl on slate	Spur pruned	Bush ..	4
1866	10	Sandy loam and limestone ..	By hand	Stakes ..	5
1867	4	Loam and rotten lime ..	Ditto	Ditto ..	Not exhibited.
1867	4	Ditto	Ditto	Ditto ..	Not exhibited.
1864	7	Gravelly and sandy.. ..	Dug and scarified ..	Ditto ..	5
1863	6	Ditto	Ditto	Ditto ..	4
1863	4	Ditto	Ditto	Ditto ..	7; hon. mention.
1868	4	Sand, clay subsoil	By hand, 2 to 3 feet ..	Ditto ..	6
1867	4	Clay, slate, and sandstone ..	Ditto	Ditto ..	5
1860	3	Sandy loam, woky clay, gravelly, and rocks	By hand and horse implements	Ditto ..	6
1869	8	Ditto	Ditto	Ditto ..	4
1866	8	Ditto	Ditto	Ditto ..	2
1863	6	Ditto	Ditto	Ditto ..	4
1865	7	Ditto	Ditto	Ditto ..	4
1867	4 to 9	Gravel, sand, and clay ..	Plough	Ditto ..	6
1865	12	Red loam, limestone bottom ..	Digging and pruning only	Ditto ..	4
1865	12	Ditto	Ditto	Ditto ..	4
1867	7	Chocolate soil	Plough and harrow ..	Espalier ..	4
1867	30	Sandy loam	Ditto	Spur pruned ..	6
1868	9	Red loam, gravelly bottom ..	7 feet square	Stakes ..	7; hon. mention.
1869	9	Ditto	Ditto	Ditto ..	7; hon. mention.
1867	10	Red loam, slate, & sandstone rock	By hand, 18 inches ..	Ditto ..	9; second prize.
1866	5	Sandy loam	Plough, horse-hoe, &c.	Trellised ..	10; first prize.
1868	9	Red clay, gravel, slate, black surface soil	By hand	Stakes ..	2

Report of Herr Freiherr Dael von Koeth.

Section 13, No. 1.—Inferior red wine, the slight unsoundness of which cannot be mistaken.

Section 13, No. 5.—Decidedly unsound.

Section 13, No. 13.—Red wine, of a Burgundy flavor.

Section 13, No. 17.—This red wine is similar to the wines from the south of France; is, however, anything but fine, and unsound into the bargain.

Section 13, No. 20.—Red wine, of muscatel taste, but poor, flat, and inferior.

Report of Herr Fred. Seyler.

Section 13, No. 15.—A small wine, of not much value.

Section 13, No. 18.—A wine of good quality, but not pure in taste.

Section 13, No. 21.—Turned sour.

Section 13, No. 24.—Impure in taste; in the style of our inferior red wines.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS B, SECTION 14.—OPEN TO THE AUSTRALIAN COLONIES.—LIGHT

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
§ 2	* 1	Henry Rau ..	Albury, N.S.W. ..	Aucorot	Aucorot ..
	2	Messrs. Wyndham ..	Dalwood, N.S.W...	Pineau	Bukkulla White
	3	E. Schroeder ..	Castlemaine ..	Reisling	Reisling ..
3	* 4	E. J. Peake ..	Clarendon, S.A. ..	Ditto	Ditto .. ..
§ 3	* 5	Ditto	Ditto	Palamino Blanco ..	Palamino Blanco
	6	Weber Brothers ..	Geelong	Pineau Blanc ..	Pineau Blanc ..
	7	Thos. Meredith ..	Chewton.. ..	Shepherd's Reisling	Reisling ..
2	* 8	David Randall ..	Seacombe, S.A. ..	Reisling	White .. ..
§ 3	* 9	Ditto	Ditto	Reisling, Tokay, Verdeilho	White .. ..
3	* 10	Trowette & Blampied	Great Western ..	Reisland	Reisland ..
	11	H. Jures	Shenthall, S.A. ..	Madeira	Madeira ..
2	* 12	Ditto	Ditto	Ditto	Ditto .. ..
1	* 13	Ditto	Ditto	Ditto	Ditto .. ..
§ 2	* 14	James Doyle ..	Lochinvar, N.S.W.	Shepherd's Reisling	Kalondah White
2	* 15	Ditto	Ditto	Verdeilho ..	Ditto .. ..
§ 3	* 16	George White ..	Fullarton, S.A. ..	Doradilla ..	Doradilla ..
§ 3	* 17	Ditto	Ditto	Temperano Blanco	Temperano ..
3	* 18	Ditto	Ditto	Pedro Ximenes ..	Pedro Ximenes..
§ 3	* 19	Ditto	Ditto	Palamino Blanco ..	Palamino Blanco
3	* 20	August Heine ..	Sandhurst ..	WhiteHermitage and Sweetwater	.. ..
	21	William Greene ..	Angaston, S.A. ..	Reisling	Hock .. ..
	22	Otto Jung	Castlemaine ..	Rousette and Reisling	.. ..
	23	Ditto	Ditto	Chasselas ..	.. ..
§ 2	* 24	George White ..	Fullarton, S.A. ..	Doradilla ..	Doradilla ..
	25	Ditto	Ditto	Ditto	Ditto .. ..

Report of M. Oscar Schmidt.

Section 14, No. 17.—Same recommendation as for the preceding sample, *i.e.*, section 14, No. 19. The frequent racking off not to be omitted.

Section 14, No. 19.—This wine approaching in character to the Bordeaux wines, deserves careful management.

Report of M. L. Célérier.

Section 14, No. 17.—Clear wine; has much analogy with the white wines from the district of Bordeaux. It has more body than the last, *i.e.*, No. 19, but tastes less favorably.

Section 14, No. 19.—Very clear wine. Has much analogy with the common white wine of Bordeaux (called de L'Entre-deuxmero), but has no flavor; it resembles also certain wines from the neighborhood of Bayonne. Its value is about 35 francs to 40 per hectolitre (£1 8s. to £1 12s. per 22 gallons), and seems likely to keep for a long time.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 1, 5, 9, 14, 16, 17, 19, and 24.

1870.—STATEMENT—*continued.*

WHITE WINE, ANY VINTAGE.—FIRST PRIZE, £12; SECOND PRIZE, £6.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1869	5	Red clay	By hand	Stakes.. ..	6
1868	12	Deep red sandy loam ..	Plough, horse and hand hoe	Trained on wire	5
1868	5	Clay and rocks	By hand	Stakes, 4 x 4 ..	Not exhibited.
1868	12	Rich red marl on rotten slate	Trellised	Trained on wire	3
1868	12	Ditto	Spur pruned ..	Bush	2
1867	11	Sandy loam and limestone ..	By hand	Stakes.. ..	3
1867	6	Clay	Ditto	Ditto	6
1863	6	Sandy loam, clay, and gravel	By hand and horse ..	Ditto	1
1869	8	Ditto	Ditto	Ditto	2
1867	4 to 9	Gravel, sand, and clay ..	Plough	Ditto	3
1863	16	Sandy loam and quartz gravel	4 x 4 feet	Bush	1
1864	16	Ditto	Ditto	Ditto	6
1866	16	Ditto	Ditto	Ditto	2
1867	13	Sandy loam	Plough and harrow ..	Espalier ..	6
1866	30	Ditto	Ditto	Spur pruned ..	2
1868	9	Red loam, gravelly bottom ..	7 feet square ..	Stakes.. ..	4
1868	9	Ditto	Ditto	Ditto	8; hon. mention.
1868	9	Ditto	Ditto	Ditto	9; hon. mention.
1868	9	Ditto	Ditto	Ditto	9; hon. mention.
1868	8	Red loam, slate, and sandstone rock	By hand, 18 inches ..	Ditto	7
1864	20	Red and black	Plough and hoe ..	Pruned long, unstaked	First prize.
1868	8	Red clay, gravel, slate, black surface soil	By hand	Stakes.. ..	6
1869	9	Ditto	Ditto	Ditto	6
1865	9	Red loam, gravelly bottom ..	7 feet square ..	Ditto	4
1867	9	Ditto	Ditto	Ditto	9; second prize.

Report of Dr. F. A. Buhl.

Section 14, No. 1.—Southern France *liqueur* wine; badly cultivated, 80 f.

Section 14, No. 14.—German Stein wine; 110 f.

Section 14, No. 24.—Beginning of unsoundness.

Report of Herr Freiherr Dael von Koeth.

Section 14, No. 5.—This white wine has a great similarity to the wine enumerated in section 5, No. 7; is, however, not of such good quality.

Section 14, No. 9.—Quite the taste of a white dry Hungarian wine.

Section 14, No. 16.—This wine has, by defective corking, assumed a mouldy taste, and deserves therefore no further notice.

Report of Herr Fred. Seyler.

Section 14, No. 1.—A very sweet wine; in character like the wines in southern France; of middling value.

Section 14, No. 14.—A fine solid wine, in the character of the Stein wines; valuable.

Section 14, No. 24.—Rather acid; taste not pleasing.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine rangd from 1 to 10.

INTERCOLONIAL WINE EXHIBITION,

CLASS B, SECTION 15.—OPEN TO THE AUSTRALIAN COLONIES.—

No. of Bottles of each Exhibit sent to the Agent-General for further Report.	No. as on Bottle	Name of Exhibitor.	Locality.	Names of Grapes from which Wine was made.	Name of Wine.
	1	Messrs. Wyndham ..	Dalwood, N.S.W.	Pineau	Bukkulla White
§ 3	* 2	E. J. Peake ..	Clarendon, S.A. ..	Sweet Wine ..	Clarendonia ..
3	* 3	Heine & Greiffenhagen	Strathfieldsaye ..	Frontignac ..	Frontignac ..
2	* 4	David Randall ..	Seacombe, S.A. ..	Shiraz and Carbinet	Liqueur or Constantia
§ 2	* 5	Ditto	Ditto	Shiraz, Carbinet, and Mataro	Ditto .. ..
	6	Trowette & Blampied	Great Western ..	Mixture	Liqueur Wine ..
	7	Fredk. Hirsche ..	Castlemaine ..	Hermitage & Muscat	Red Liqueur Wine
§ 3	* 8	Joseph Gillard ..	Norwood, S.A. ..	Frontignac ..	Constantia ..
3	* 9	Thomas Hardy ..	Adelaide, S.A. ..	Muscatel ..	Muscatel ..
§ 3	* 10	Ditto	Ditto	Ditto	Ditto ..
	11	Ditto	Ditto	Black Portugal ..	Black Portugal ..
§ 1	* 12	S. H. Holmes ..	Lochinvar, N.S.W.	Gouais and Lambruscat	Gouais and Lambruscat
2	* 13	Ditto	Ditto	Hermitage & Shiraz	Hermitage and Shiraz
2	* 14	Ditto	Ditto	Hermitage ..	Hermitage ..
2	* 15	Ditto	Ditto	Verdeilho ..	Verdeilho ..
2	* 16	Ditto	Ditto	Shiraz	Shiraz ..
§ 3	* 17	August Heine ..	Sandhurst ..	Muscat Blanc ..	.. ..
	18	Otto Jung	Castlemaine ..	Hermitage ..	.. ..
	19	Ditto	Ditto	Reisling	.. ..

Report of M. Oscar Schmidt.

Section 15, No. 17.—Being sound, does not give rise to any special remarks.

Report of M. L. Célérier.

Section 15, No. 17.—Wine of excellent quality. It has much analogy with the white wines of the south of France (Department of Hirault) called Picardans. It is in very good state of preservation, and represents in France a value of 50 f. per hectolitre (£2 per 22 gallons), taken at the vineyard. It has been harvested under favorable circumstances, and is undoubtedly the produce of a year favorable to the vine. It seems to have been carefully treated in store, and likely to keep sound for a long time.

NOTE.—An asterisk (*) is attached to the numbers sent to the Agent-General.
Samples marked thus (§) reported upon by foreign judges, viz., Nos. 2, 5, 8, 10, 12, and 17.

1870.—STATEMENT—*continued.*

SWEET OR LIQUEUR WINE, ANY VINTAGE.—FIRST PRIZE, £8; SECOND PRIZE, £4.

Date of Vintage.	Age of Vines.	Nature of Soil.	How Cultivated.	Whether Vines are trained to Stakes or otherwise.	Number of Marks awarded by the Victorian Judges.
	Years.				
1868	9	Red loam, very rich ..	Plough and hoe ..	Trained on wire	First prize.
1863	12	Red loam on rotten slate ..	Spur pruned	Bush	8; hon. mention.
1868	5	Sand, clay subsoil	By hand, 2 to 3 feet	Stakes ..	4
1864	7	Sandy loam, clay, and gravel	By hand and horse ..	Ditto	2
1869	8	Ditto	Ditto	Ditto	6
1867	4 to 9	Gravel, sand and clay ..	Plough	Ditto	Not exhibited.
1867	13	Yellow clay and slate ..	4 by 4 feet ..	Ditto	4
1866	12	Red clay, limestone bottom ..	By hand, pruned to two eyes	Bush	Second prize.
1867	10	Alluvium, lime and clay subsoil	Plough	Trained to 1 wire	8; hon. mention.
1869	12	Ditto	Ditto	Ditto	8; hon. mention.
1869	7	Ditto	Ditto	Ditto	5
1867	2½	Red marl ridge, magnesian-limestone subsoil	Plough and scarifier	Stakes, 1 wire 3 ft. from ground	6
1868	2½	Ditto	Ditto	Ditto	2
1869	4½	Ditto	Ditto	Ditto	2
1867	2½	Ditto	Ditto	Ditto	3
1869	4½	Ditto	Ditto	Ditto	3
1869	11	Red loam, slate, and sandstone rock	By hand, 18 inches ..	Stakes ..	4
1868	8	Red clay, gravel, slate, and black surface soil	By hand	Ditto	4
1868	8	Ditto	Ditto	Ditto	3

Report of Dr. F. A. Buhl.

Section 15, No. 5.—Southern France muscat. 150 f.

Section 15, No. 12.—Sherry for England. 270 f.

Report of Herr Freiherr Dael von Koeth.

Section 15, No. 2.—Very pleasant sweet wine, of the quality of Tokay, or more correctly of the Cyprus wines; may be a boiled wine.

Section 15, No. 8.—Sweet white wine, resembling very much the ordinary Malaga.

Section 15, No. 10.—Of this wine the same may be said what has been said of the wine section 15, No. 2, which it surpasses in delicacy but not in body.

Report of Herr Fred. Seyler.

Section 15, No. 5.—Very sweet, in the style of the wines in southern France; of rather high value, and very good quality.

Section 15, No. 12.—Sherry like; fine wine, of considerable value.

NOTE.—In accordance with the regulations of the Victorian Judges, the number of marks awarded to any exhibit of wine ranged from 1 to 10.

APPENDIX P.

A NEW DISEASE AMONG RYE-GRASS.

The diseases—both animal and vegetable—which affect the crops of the farmer are indeed legion, for no sooner does one pass away than another makes its appearance. The devastation caused by the oïdium during the last season will be fresh in the minds of many; notwithstanding, that disease had scarce disappeared when a new and destructive fungus was observed, preying upon the rye-grass. This new disease, which is due to the presence on the plant of a red fungoid growth, was first observed by Mr. Read, of the Weatherboard Hill, in the Ballarat district, who communicated his discovery to the *Star* newspaper in the latter part of June of this year. He wrote—"Enclosed is a portion of rye-grass, upon which there appears to be growing a red parasitical plant that entirely destroys the grass. It appears, when viewed through the microscope, to be a firm fleshy plant, which seems to draw the life out of the grass." Mr. Thos. Bath, of Ceres, however, first brought the disease under the notice of this department in a letter dated 8th July 1873, forwarding at the same time some specimens of affected grass for examination. These were found to be covered with a red, semi-transparent, branched fungus, which appeared to gradually destroy the grass by exhausting its elaborated juices. On closer examination, the fungus was seen to exist on the same plant in various stages of development; and as it exhausted, the juices of one portion and the part died off, a new growth seemed to be thrown up from the mycelium in the portion next adjoining it. Baron von Mueller, Government Botanist, to whom a specimen of the diseased grass was submitted, has reported that the fungus had only recently, for the first time, been brought under his notice. He described it as one of the cryptogamic fungi, belonging to the genus *Clavaria*, but expressed his inability to give its specific name, as he had not the necessary books of reference at his command.

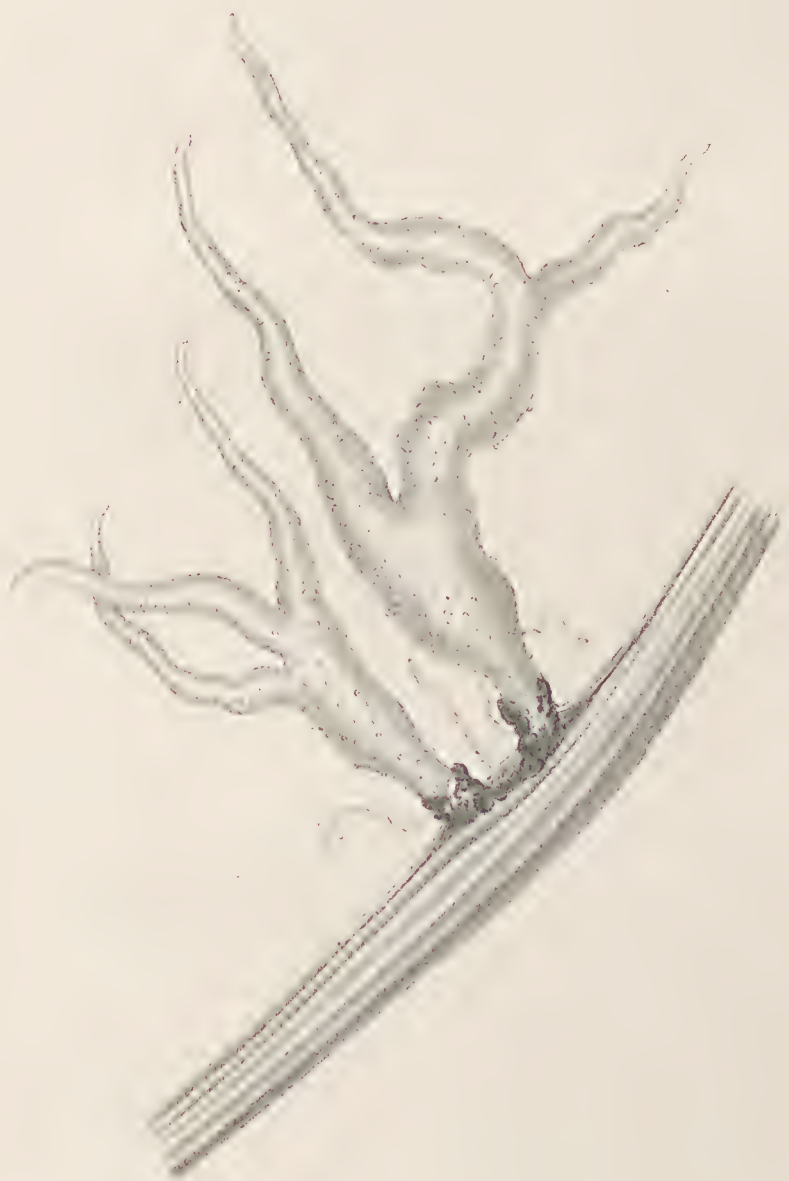
Though the disease was first observed in the pastures at the foot of the Weatherboard, it soon proved to be by no means confined to that locality. Mr. Thos. Bath next discovered it in his grass lands at Ceres, and subsequently it was found to exist pretty generally throughout the whole of the Ballarat and its surrounding districts. It has been noticed as far west as Trawalla, and as far east as Smeaton, and more recently as far south as the Indented Heads, near Geelong. The disease gives to the affected pastures a patchy appearance, as it does not attack the

PLATE X.

RYE GRÁSS FUNGUS.

a. Grass and fungus natural size
b.& c. " " " magnified about six diameters.

PLATE XI.



RYE GRASS FUNGUS.

Magnified about twenty diameters

whole of a paddock in the same degree. These patches, viewed at a distance, possess a brown, withered appearance, and when inspected more closely seem as though affected with rust. On examination, however, the red aspect of the diseased grass is found not to be due to the presence of rust, but of the parasitic fungus named, which is of more formidable dimensions. Figure A, Plate X., represents a diseased stem of perennial rye-grass, and shows the fungus in its various stages of growth; figure B represents a blade of grass which has been entirely destroyed by the disease; whereas figure C represents a blade attacked, but only partially killed, and illustrates how the fungus, after it has exhausted the juices within a given portion, throws up a new growth from its mycelium. The adventitious roots produced by the grass, as shown in figure A, serve as another proof of the unhealthy condition of the plant.

The causes which produce the disease are difficult to determine; and it would be rash to express an opinion upon the same, until a thorough investigation of the fungus in every stage of its growth had been made, and the conditions under which it exists determined. Judging from its fleshy appearance, one would be led at first sight to attribute the presence of the fungus to excess of moisture, dependent on bad drainage, or to an unhealthy growth of the plant resulting from too frequent irrigation. Such, however, does not appear to be the case, for the disease is generally found to be most prevalent upon the higher and naturally drained portions of a paddock, and is seldom seen in those where excess of moisture exists. Again, it is hard to say whether the fungus in the first instance was produced from a spore of the same species, or whether it is the result of weakness in the plant. From observations made, the latter cause would seem to be the most probable. In the case of the farm of Mr. W. Anderson, of Smeaton, there were two paddocks laid down in English grasses, the one on the east, the other on the west side of the same road. The latter, which had been seven years laid down, was covered with disease, whereas in the former, which had been only one year in English grasses, not a particle of the fungus could be found. To what, then, are the presence of the disease in the one paddock and its absence from the other attributable? Probably to weakness in the crop produced from the want of a more varied mixture of grasses in the pasture. It is well known that permanent pastures consist of a number of different grasses, clovers, and other herbs, and, in most countries, when land is laid down in permanent pasture, advantage is taken of the lesson taught by nature, and a varied and suitable mixture of grasses sown. In this country, however, farmers are content to limit

their seeding to rye-grass and clover, adding, in some instances, small quantities of cocksfoot and Yorkshire fog. Such a mixture, though eminently suited for land which it is intended to maintain only a few years in grass, is unadapted for the purposes of a permanent pasture. Hence it is probably that the fungoid growth on the rye-grass is the result of weakness in the grass, dependent upon it having been too exclusively grown on the same land for a number of years in succession. With the advancement of agriculture, it will probably be found that some of our native grasses will have to play a prominent part in any mixtures for permanent pastures in this country. Having this object in view, it is intended to publish in the next annual report of this department a detailed description of the more important of them, from the pen of Mr. W. H. Bacchus, who also proposes to append an account of the observations which he has made upon the growth of exotic grasses in Victoria.

Without the causes which produce the disease and the conditions under which it is developed having been accurately determined, it is difficult to suggest any remedial measures. If governed by the fact that the parasitical growth which is formed on the rye-grass is of true fungoid origin, one would be induced to suggest an application of common salt as a cure for the disease, seeing that salt, when applied to fungi, as is exemplified in the case of the mushroom, breaks down and destroys them. But the same does not appear to hold good in this instance ; some experiments tried with applications of common salt, in proportions varying from two to four cwt. to the acre, having failed to produce any appreciable good results. Flowers of sulphur is another substance known to destroy fungi. Some experiments made with it, however, though more successful than those made with common salt, did not give sufficiently satisfactory results to justify its recommendation as a remedy. Nature, however, seems to be working her own cure, for in the pastures where only a few weeks since the disease could be seen in quantity, it is now (30th October) difficult to be found, and very little difference is discernible between the patches that were diseased and the healthy portions of the field.

APPENDIX Q.

The following letter has been forwarded for publication by the Secretary of State for the Colonies :—

Royal Gardens, Kew,
14th May 1873.

Dr. Hooker to Mr. Herbert.

SIR,

I beg to acknowledge your letter of May 7th, enclosing a despatch from the Lieutenant-Governor of Natal with the Reports on the germination of seeds of *Araucaria Cunninghamii* transmitted from Queensland packed in sand, charcoal, and sugar. Only seed of the whole seems to have germinated, and that was out of the packet packed in sand.

A similar experiment in which the seeds were transmitted from Queensland to the Cape resulted in the germination of five seeds out of the packet packed in sugar, while all the rest failed.

On the other hand, seeds of the same plants, transmitted from Sydney to the Cape in a linen bag through the post, appear to have germinated freely. I think, therefore, that it is safe to conclude that none of the methods tried by the Queensland Acclimatization Society are superior to this.

Our experience at Kew is quite conformable. Except for very exceptional cases, in which it is desirable that the seeds should be kept moist, we find that they travel best without any packing whatever.

I am, &c.,
(Signed) JOS. D. HOOKER,
Director.

R. G. W. Herbert, Esq.,
Under Secretary,
&c., &c., &c.

APPENDIX R.

BEET-ROOT SUGAR.

REGULATIONS.

Regulations made by the Governor in Council for Distribution of the Sum granted by Parliament for the Encouragement of the Manufacture of Beet-root Sugar.

The amount, Five thousand pounds, granted by the Legislature for the encouragement of the manufacture of Beet-root Sugar, will be available for distribution as follows, viz. :—

(1.) To any person or company who may produce, on or before 30th June 1873, satisfactory evidence to the Government that he or they have

manufactured (locally from one manufactory within twelve months) a quantity of not less than Five hundred tons of Sugar from Beet-root grown within the Colony of Victoria, the sum of Five thousand pounds; or, in the event of no claim being substantiated as above—

(2.) To any person or company producing proof to the satisfaction of the Government that he or they respectively have manufactured (locally from one manufactory and within a period of twelve months), on or before the 30th June 1873, a quantity of not less than One hundred tons of Sugar from Beet-root grown within the Colony of Victoria, a proportionate amount of the said sum of Five thousand pounds.

Department of Lands and Agriculture,
9th December 1872.

ENCOURAGEMENT OF THE GROWTH OF FLAX.

Regulations.

Regulations made by the Governor in Council for Distribution of the Sum granted by Parliament for the Encouragement of the Growth and Production of Flax.

Steps having been taken to encourage and increase the growth of Flax in the Colony of Victoria, it is the intention of the Department of Agriculture—

(1.) To insert an advertisement in the public papers calling for applications from persons desirous of engaging in its cultivation, such applications to be accompanied by a description of the soil and situation, including proximity to suitable water, &c.

(2.) To such applicants as may be selected by the department seed will be supplied gratuitously, but in such quantity only as may be considered expedient by the Minister of Agriculture.

(3.) The seed will be accompanied by detailed information regarding the most approved systems of cultivation and preparation of the fibre for market.

(4.) With a view of establishing the industry, the department intends to grant bonuses to those farmers or cultivators who produce the most marketable samples of fibre—quantity to be taken into consideration; such awards to be made subject to the following conditions:—

(5.) Recipients of seed will be required to forward to the department a given quantity of fibre prepared for market (quantity to be

stated in advertisement), such being a representative sample of the total produce, and to be grown from the seed supplied.

(6.) The above-mentioned samples will be duly catalogued and submitted to judges for classification, after which they will be publicly sold, and the decision of the judges, taken in conjunction with the other circumstances, will regulate the amount of the bonuses and awards.

(7.) The sums realized by the above-mentioned sales will be handed over to the respective owners of samples supplied.

Department of Lands and Agriculture,
9th December 1872.

GRANT TO AGRICULTURAL SOCIETIES.

Regulations.

Regulations made by the Governor in Council for Distribution of the Sum granted by Parliament in aid of the Funds of Agricultural Societies, 1872–3.

(1.) That the societies furnish to the Minister of Agriculture a statement showing the amount of the revenue of each derived from private contributions during the last financial year of each, together with a statement showing the sum paid away in prizes during the same period; both statements to be verified by statutory declaration before a magistrate.

(2.) That, on receipt of the above statements so verified, the Minister of Agriculture cause to be paid to the proper officer of each society a sum equal to one-half of the amount shown to have been paid away in prizes by such society during the period before mentioned, on the condition that this sum is not in excess of the amount raised by private contributions. But if the proposed grant exceed the amount raised by private contributions, that it be in that case reduced to a sum equal to the amount so raised.

(3.) That the whole sum divided do not exceed Four thousand pounds, and if the sums claimable are in excess of this amount that they be reduced *pro rata.*

Department of Lands and Agriculture,
9th December 1872.

GRANT TO AGRICULTURAL SOCIETIES.

REGULATION APPROVED BY THE GOVERNOR IN COUNCIL ON 19TH MAY 1873.

Additional Regulation made by the Governor in Council for Distribution of the unappropriated balance of the Sum granted by Parliament in aid of the Funds of Agricultural Societies, 1872–3.

That the balance of the sum of Four thousand pounds granted by Parliament in aid of the funds of Agricultural Societies, 1872–3, remaining unappropriated after the distribution under the Regulations of the 9th December 1872 be given to the small societies in the Loddon and other districts of Victoria, conditionally on such societies uniting to form one society to represent each such district; but in no one instance shall the sum given exceed One hundred pounds.

Department of Lands and Agriculture,
Melbourne, 10th May 1873.

APPENDIX S.

SCHEDULE SHOWING DISTRIBUTION OF GRANT TO AGRICULTURAL SOCIETIES.

	£	s.	d.
Apsley	35	10	0
Ararat	122	12	6
Bacchus Marsh, Ballan, and Pentland Hill	60	3	9
Ballarat	372	17	6
Beaufort	62	18	9
Belfast	62	14	9
Baringhup	62	2	0
Bendigo	278	16	3
Castlemaine	101	14	0
Dandenong and South Bourke	62	12	6
Eddington	69	6	0
Geelong & Western District	358	12	3
Gippsland North ...	60	15	0
Glendaruel, Beckwith, and Clunes	204	9	6
Glenlyon, Franklin, and Daylesford	111	19	3
Hamilton	108	10	0
Hampden and Heytesbury	37	3	9
Hardie's Hill, Cargerie, and Mount Mercer ...	28	5	6
Hexham Long-woolled Sheep Association ...	47	5	0
Kyneton	296	18	9
Mansfield	45	5	0
Merino and Sandford ...	32	9	0
Mornington Farmers' Society	67	5	0
Newbridge	51	7	6
Newstead	88	11	3
Ovens and Murray ...	52	2	0
Polwarth and South Grenville	47	8	0
Smeaton, Spring Hill, and Bullarook	303	4	6
South Bourke	14	9	1
St. Arnaud	49	2	6
Terang and Mortlake ...	48	5	0
Victoria	120	7	6
Villiers and Heytesbury	107	16	0
Wahgunyah	49	8	6
Wimmera	58	12	8
£	3,701	0	6

APPENDIX T.

SCHEDULE SHOWING DISTRIBUTION OF VOTE FOR FENCING AND IMPROVING PARKS AND GARDENS UNDER THE CONTROL OF BOROUGH COUNCILS, TRUSTEES, COMMITTEES OF MANAGEMENT, ETC, 1872-3.

Applicants.	Sum Expended during past Financial Year, exclusive of Government Subsidy.	Amount allotted out of the Vote for 1872-3.
	£ s. d.	£ s. d.
Bairnsdale Shire Council	57 10 0	23 0 0
Ballarat City Council*	...	666 13 4
Ballarat East Borough Council	375 0 0	150 0 0
Ballarat Shire Council	79 6 8	31 14 8
Beechworth Shire Council	54 0 0	21 12 0
Belfast Borough Council	126 4 11	50 9 11
Brown's and Scarsdale Borough Council ...	223 19 7	87 11 10
Brunswick Borough Council	60 3 8	24 1 6
Buninyong Borough Council	169 11 2	67 16 6
Camperdown Public Park Committee of Management	38 10 0	15 8 0
Carisbrook Borough Council	36 7 6	14 11 10
Castlemaine Borough Council	143 0 0	57 4 0
Caulfield Shire Council	19 7 6	7 15 0
Colac Public Park Trustees	39 8 1	15 15 3
Craigie Borough Council	15 0 7	6 0 3
Creswick Borough Council	18 0 0	7 4 0
Creswick Shire Council	84 11 10	33 16 9
Daylesford Borough Council	89 6 0	35 14 5
Dunolly Borough Council	24 19 9	9 19 11
Eaglehawk Borough Council	665 18 0	266 7 2
Echuca Borough Council	78 12 6	31 9 0
Elwood North Public Park Trustees	59 6 4	23 14 6
Emerald Hill Borough Council	427 3 0	107 17 2
Footscay Borough Council	69 19 0	27 19 7
Geelong Botanic Garden Trustees* ‡	...	666 13 4
Geelong Borough Council	334 4 8	133 13 10
Geelong, Kardinia Park Committee of Management	1,120 10 2	448 4 1
Hawthorn Borough Council	31 12 10	10 13 1
Inglewood Borough Council	54 7 0	21 14 10
Kangaroo Flat Recreation Reserve Trustees ...	50 0 0	20 0 0
Kew Borough Council	50 0 0	20 0 0
Kilmore Borough Council	99 0 0	39 12 0
Koroit Botanic Gardens Committee of Management	77 7 0	30 18 10
Kyneton Shire Council	68 16 8	27 10 8
Maldon Shire Council	168 2 0	67 4 10
Malmsbury Borough Council	49 17 6	19 19 0
Marong Recreation Reserve Trustees	88 3 0	35 5 2
Maryborough Borough Council	88 10 0	33 8 0
Mornington Public Park Committee of Management	157 0 0	62 16 0
Mortlake Public Park Committee of Management	75 18 0	30 7 2

SCHEDULE OF VOTE FOR FENCING, ETC.—*continued.*

Applicants.	Sum Expended during past Financial Year, exclusive of Government Subsidy.	Amount allotted out of the Vote for 1872-3.
	£ s. d.	£ s. d.
Northcote Recreation Reserve Committee of Management	20 5 0	8 2 0
Queenscliff Borough Council	85 10 0	34 4 0
Richmond Borough Council	144 16 1	57 18 10
Rutherglen Borough Council	142 12 6	57 1 0
Sale Borough Council	59 17 1	23 18 10
Sandhurst City Council*	1,498 18 10	666 13 4
Sandridge Borough Council	177 13 9	71 1 6
Smythesdale Borough Council	41 1 6	16 8 9
Stawell Borough Council	33 1 9	13 4 8
Steiglitz Borough Council	19 16 0	7 18 5
Wangaratta Borough Council	61 18 9	24 15 6
Warrnambool Borough Council	104 7 0	41 14 10
Wyndham Shire Council	20 0 0	8 0 0
		4,482 18 3
Queen's Gardens, Geelong, Trustees† ...	...	8 10 11
Sorrento Public Park Trustees†	...	8 10 10
		4,500 0 0

* Ballarat and Geelong, although no sums were expended from local funds, were for this year placed on an equality with Sandhurst, each having been allotted £666 13s. 4d.

† The balance remaining on vote after each local body had been allotted a sum equal to two-fifths of the amount shown to have been expended locally, has been allotted to the trustees of the Queen's Gardens, Geelong, and the Sorrento Public Park in the above proportions.

‡ The trustees of the Geelong Botanical Gardens, owing to the exceptional circumstances of their trust, received an additional grant of £333 6s. 8d.

APPENDIX U.

THE APPOINTMENT OF A SECRETARY FOR THE DEPARTMENT OF AGRICULTURE.

After the Department of Agriculture had been established, and the Honorable J. J. Casey appointed Minister of Agriculture, some difficulty was experienced in securing, for the office of Secretary and permanent head of the department, a person whose previous training and knowledge of agriculture, both in a practical and scientific point of view, would justify his appointment to the position. Agricultural science, in its widest scope, embraces a vast range of subjects. The natural sciences of chemistry, geology, botany, physics, zoology, meteorology, mechanics, and physiology, are most intimately connected with it. It is likewise closely related to social and political economy, commerce, and law. An extensive professional knowledge, therefore, being required, it was deemed necessary to call upon candidates for the appointment of Secretary for Agriculture to give evidence of their special fitness for the office; and with a view to test their qualifications, and to obtain from among their number the person best fitted to occupy the position, a *Gazette* notice was issued on the 30th August 1872, and an advertisement inserted in the leading journals of this and the neighbouring colonies, requiring candidates to forward their applications to the Crown Lands Department, Melbourne, addressed to the Honorable the Minister of Agriculture, on or before the 25th day of September 1872. Each candidate was requested to transmit a paper upon what he considered the benefits that could be conferred upon the agricultural community by the establishment of a Department of Agriculture, its functions and management. Applications were required to be made in a *nom de plume*, accompanied by a sealed envelope containing the name and address of the candidate, copies of any testimonials which he was able to produce as to character and ability, and statutory declaration that the paper forwarded by him was his own composition and in his own handwriting. Fifty-four applications were received from persons in this and the neighbouring colonies, and subsequently, when the appointment had been made, one from India. The papers were submitted in the first instance to Mr. W. H. Archer, Registrar-General, Mr. H. Byron Moore, Assistant Surveyor-General, and Mr. Arthur Morrah, who placed the writer of the paper signed "Œkonom" first on

the list of candidates, and subsequently to the presidents of four of the leading agricultural societies of the colony, viz., Ballarat, Kyneton, Geelong, and Bendigo, who confirmed the selection of the former examiners. The appointment was therefore conferred on Mr. A. R. Wallis, in accordance with their recommendations.

Subjoined are the reports of the examiners, and the paper of the successful candidate.

Office of Lands and Survey,
Melbourne, 4th November 1872.

Sir,—We have the honour to report that, having perused the fifty-four Essays written by the applicants for the secretaryship to the Agricultural Department, we find that there are three productions of decidedly superior merit, both in a literary and practical point of view :—

1. Œkonom	No. 28	First Class.
2. Arvorum pecorumque cultus ...	No. 43	
3. Navaujero Seville	No. 37	

A second class in order of merit comprises twenty-five essays, namely, Nos. 1, 3, 7, 11, 13, 14, 15, 18, 19, 20* (Triptolemus), 21, 22* (Celer et audax), 24, 25, 26, 30, 31, 32, 34, 36, 39, 44, 45, 47* (Australia Felix), and 49. The three marked with an asterisk are among the best of these.

Among the third class, containing the remaining twenty-six essays, there is one, No. 33, which, if it had been original, we should have placed among the second if not among the first class, but its plagiarism is so glaring from the report of Mr. Commissioner Horace Capron, U.S., 1869, that we feel bound to relegate it to the lowest rank.

We have the honor to be, sir,
Your most obedient servants,

W. H. ARCHER,
ARTHUR MORRAH,
H. BYRON MOORE.

The Honorable
the Minister of Agriculture,
&c., &c., &c.,
Melbourne.

Melbourne, 8th November 1872.

Sir,—We have the honour to inform you that we have this day gone through the fifty-four Essays, and have unanimously come to the conclusion that the writer of the Essay signed "Œkonom," Mr. Alexander Robert Wallis, is the fittest of the applicants to fill the position of Secretary to the Department of Agriculture.

We have arrived at this conclusion by a process of sifting—first by rejecting forty essays which on the face of them it was evident their writers were unsuitable for the post sought; secondly, by going carefully through the remaining fourteen, together with the testimonials, which were opened in our presence. By this means the eligible applicants were reduced to three, then two, and that of these two Mr. Wallis was on the whole judged to be fittest.

We feel gratified in being able to state that if anything were wanting to convince us that we have made the best selection, it is supplied in the fact that the final choice fell upon the very three chosen by Messrs. Archer, Morrah, and Moore, who had not the advantage of knowing the antecedents of the essayists by seeing their testimonials, and that of these three Mr. Wallis, under his *nom de plume* of Œkonom, was placed at the top of their list.

We, as delegates of the agricultural societies which we represent, desire to express our approval of the method adopted by the Honorable the Minister of Agriculture in regard to the various steps he has taken to secure the services of a competent secretary to the new department, therefore beg unanimously to recommend Mr. Wallis for the appointment.

JOHN MIDDLEMISS,
President Geelong and Western District Agricultural Society.

J. HORWOOD,
President of the Bendigo Agricultural Society.

WILLIAM THOMSON,
Kyneton Agricultural Society.

DONALD GUNN,
President Ballarat Agricultural and Pastoral Society, Ballarat.

The Honorable
the Minister of Agriculture,
&c., &c., &c.,
Melbourne.

A DEPARTMENT OF AGRICULTURE: ITS BENEFITS TO THE COMMUNITY, FUNCTIONS, AND MANAGEMENT.

Introduction.

In the following paper I have endeavoured to bring within the narrowest possible limits my remarks upon the "Advantages, Functions, and Management of a Department of Agriculture." Nevertheless, in doing so, I have striven to avoid the omission of any one important point, though in some, I might say many instances, I have given little more than a brief outline of the subject touched upon, and in no case have I committed myself to minute detail. My reason, however, for pursuing this course will, I think, be self-evident to all who may be able to estimate the magnitude of the subject; for to write exhaustively, assuming that to be possible, upon one function alone—the education of the rising generation of farmers—one would require many times the space allotted to the present paper. Such a course of procedure would, manifestly, have been incompatible with the object directly in view; still I trust that, in attempting to accomplish my aim, I have not failed to render myself sufficiently comprehensive, and thereby fallen short of the required standard.

The Benefits that can be conferred upon the Agricultural Community.

These will be various in their character. By disseminating useful knowledge, the result of positive experience, amongst farmers, the department will be the means of causing a rational system of agriculture to be established in our midst, without which land appropriated to tillage cannot maintain its fertility. Further, by pointing out to the farming population methods which, if adopted, will enable them to turn their land to better account, to reap the largest amount of produce from a given area of ground, and to grow crops year by year on the same soil, at the minimum of cost and maximum of profit, and without fear of exhausting its fertility, it will revolutionize the agriculture of the colony. But not this alone. By bringing about a more stable condition of things, and by instructing the farmer how he may best support himself and family upon the produce of his holding, the department will be instrumental in raising the social position of the selector, who, becoming attached to his dwelling, will settle down to improve his property, and to make for himself and children a comfortable home and valuable

inheritance, instead of living in anticipation of having one day to seek a new field, owing to his land having become exhausted, and to having been reduced himself to the last stage of poverty. Thus would Victoria be spared the misery which now threatens the colonies of Tasmania and South Australia. Tasmania, as is well known, with an area of 26,215 square miles (Bevan), equal to 16,777,600 statute acres, is unable to feed a population of only 101,785 souls. This condition of things is doubtless partly due to the low agricultural value of a vast tract of that island; still a portion must also be attributed to the exhaustive system of farming which has been practised for so many years in the country. South Australia, again, is fast approaching the same end, and we witness almost daily the previously fertile districts of that country left barren and desolate, of no value to the private individual, and consequently worthless to the State, the owners being glad to seek a refuge in the Wimmera district of this colony. Such a calamity should not be allowed to befall Victoria. If a country is to flourish, the producing capabilities of its soil must be in a healthy condition. It should, therefore, be the policy of our Government to discourage a system which would tend slowly yet surely to rob the country of its wealth by exhausting its agricultural areas. Since, then, it has been the aim—wisely I think—of successive Administrations to encourage settlement, it is manifestly also the duty of the Government to render some aid to those whom it has placed upon the land.

The benefits conferred by the department will not be limited to the agricultural classes. Every member of the community will profit more or less by the stimulus which, owing to the increased productiveness of the soil, will be given to our commerce generally. For since we will be enabled to produce within ourselves, and at the minimum of expenditure, all the necessaries of life, things in general will tend to become more equalized. And here I may mention that, in speaking of necessaries, I allude not alone to the direct necessaries of meat and drink, but also to those of a more indirect nature—for example, fibre-yielding plants for the manufacture of linen and other fabrics, as also plants yielding oleaginous fruits or seeds for the extraction of vegetable oils, and the like. Food, as a natural consequence, will be more abundant, cheaper, and subject to less fluctuation; labour, in its turn, will likewise be reduced in money value, while wages will have a higher absolute worth. Gold will be obtained at a less cost, and mines now unproductive of gain will be worked at a profit. Industries, also, which as yet we have been unable to establish successfully, in consequence of the high price of labour, will take root and flourish. Hence, I maintain, it may

be justly affirmed that agriculture is the most important industry of the State, since the success of her other sources of revenue is dependent upon its prosperity.

Its Functions.

The first duty of the department will be to make itself thoroughly acquainted with the systems of agriculture practised in the colony. No one calling is so strictly local—that is, influenced by local circumstances and conditions—as agriculture. It is therefore imperative, before attempting to aid an agricultural community, to obtain all information upon the conditions under which the farmer has to labour. This could be best accomplished through the medium of the existing agricultural societies. Printed circulars, denoting the nature of the information required, should be forwarded to the secretaries of such bodies, who should be requested to send a copy to every intelligent farmer in the district. The object of the enquiry would be to collect all available information upon the farming of the different agricultural centres—not alone of the ordinary routine of farm management, but also of the nature of the soil, and proximity to markets, together with the experience of individual farmers regarding the climate, crops grown, and productiveness of the land. A competent officer of the department should also be sent to inspect and report upon the agricultural districts of the colony, who, from his more extensive experience, would be better qualified to duly estimate their natural capabilities. Such officer would also be able to glean from resident farmers minute and reliable information upon the fertility of the soil, climatic influences, general farm management, &c. The official report, as well as the information solicited from resident farmers, having been obtained, duly analysed and epitomised, the department would be placed in possession of a store of information relative to the local and general capabilities and requirements of the colony, which would enable it to commence its labours, and to render assistance to the agricultural community.

The next office of the new department will be to open a correspondence with the agricultural departments and leading agricultural societies of foreign countries, and to gather from these all available knowledge upon the science and practice of agriculture, including live stock, economic plants, forest culture, and rural industries. From this information, when obtained, selection should be made, in the first instance, of such products as could be turned most speedily to profitable account, with a view to their immediate introduction. The plants and seeds procured should be distributed amongst our farming and gardening classes, and always with due reference to the suitability of the district

or districts to which these may be forwarded. It naturally follows that the above-mentioned duties—the introduction and distribution of plants and seeds—forming a part of the functions of the Department of Agriculture, will require to be conducted through a branch establishment, and I assume, therefore, the Department of Botany already in existence will be capable of rendering valuable services in this direction. All plants and seeds received should be duly entered in the books of the department. A part should always be retained for experimental culture in the Botanic-gardens, and the balance distributed as above indicated, the recipients being required to furnish to the department (and they would doubtless be glad and willing to do so) a short report upon the process of cultivation adopted in each instance, as well as their own views upon the adaptability or otherwise of the plant or plants to the district. These, together with accurate observations made and noted in the Botanic-gardens, would furnish sufficient data upon which to form fairly reliable conclusions respecting the relative merits of the plants introduced.

But not alone by obtaining economic plants, and gleaning valuable information from foreign countries, will the department be instrumental in promoting the commercial interests of the colony. It should also have in view the development of local industries from plants indigenous to the country. By this I mean to infer that it will be one of the duties of the department to cause investigation to be made into properties possessed by the eucalypti and other common trees of Victoria. That there is much wealth locked up even in the leaves, bark, and fibre of many of our more common trees and plants cannot, I think, be questioned for one moment. Mr. Bosisto, a Victorian chemist, it is stated, and more lately M. Cloëz, a French chemist, have discovered that the leaves of our despised gum trees contain agents possessing valuable medicinal and economic properties. The eucalypti, however, are not the only indigenous plants that yield substances of commercial importance. The wattle, as is well known, is very highly esteemed for the tannin contained in its bark. But there are still others, the sassafras, for example, which grows abundantly in the gullies of many of our ranges. The bark of this latter tree possesses an intensely pungent and bitter taste, and if it were subjected to minute chemical investigation, would probably be found to contain a powerful alkaloid, possessing therapeutical properties equal to those of quinine, though the substance itself might not be identical with quinine in chemical composition. The chemist engaged under the department of botany might be employed with advantage in original research of this description, as well as with the analysis of soils and general farm products; it should, therefore, be

the object of the Department of Agriculture, in the interests of the community, to arrange that a plan somewhat after the nature of the above be carried into effect.

There is still one other branch of the public service which, in my humble opinion, might be profitably utilized in connexion with the new department. I allude to the meteorological branch of the Observatory. At the same time, I am perfectly aware that a weekly meteorological report is furnished by the Government Astronomer to the leading journals, through whose agency it is afforded an extensive circulation. Still, meteorology as a science is most intimately connected with agriculture, much more so, indeed, than scientific or practical farmers hitherto have been wont to consider. Clearly, then, it is deserving of more close investigation, and it is, in fact, daily receiving greater attention at the hands of scientific observers. The total annual rainfall, and its distribution over the several months of the year and different districts of the colony, the variations in temperature, and the average of fine to dull, cloudy days, play each an important part in the economy of the plant. An accurate and minute meteorological report, furnished at regular intervals, would, therefore, be of inestimable value, and I feel sure the very able officer at the head of that branch of the public service will have pleasure in co-operating with the new department, by supplying the desired information.

I would further suggest that the Department of Agriculture invite the co-operation of the Acclimatisation Society, as much useful knowledge might be gathered from that source, and the council will doubtless be glad to render all assistance in its power.

The next duty of the department will be to consider the best means for conserving the State forests and for preventing the wasteful destruction of timber hitherto in practice. To accomplish this the forests will require to be brought under the Department of Agriculture. But I would be disposed to make a sub-department of them, and thereby to give to the inspector, or whatever might be his distinguishing title, some freedom and independence of action, assuming always that matters of importance would be first submitted to the Department of Agriculture for the sanction of the Minister. With regard to the system of management, I would be disposed to base any future regulations for conserving and planting (but conservation should be the main object in view under present circumstances) upon one or more of the systems now practised on the continent of Europe. It would matter but little whether we took the forest department of France or that of one of the German states as our type, as each of these is known to work satisfac-

torily. For my part, however, I would be inclined to prefer the German to the French system, as it provides for a more perfect subdivision of labour, and thereby materially reduces the cost of supervision and forest management. To give a general outline of the course which should be adopted, I would recommend that all the forest lands to be reserved by the Government as State forests be clearly defined and proclaimed as such. That the forests in each district be then subdivided into convenient-sized blocks, which, of course, to some extent would have to be regulated by local circumstances, each block being placed under the care of an under-forester (Unter-förster in Germany), who will be held responsible to the head-forester (Ober-förster) of the district, this latter officer being answerable to the inspector, and the inspector to the Department of Agriculture. In Germany the strictest rules are laid down to govern the felling of the timber, and no portion of a forest is permitted to be cleared without being duly replanted. But deviation from this practice will be necessary in certain districts of the colony under existing circumstances. At the same time, it is frequently but erroneously asserted that we do not require to consider forest conservation in this country, since land which has been denuded of its timber rapidly becomes re-covered with young wood, provided only cattle are prevented from grazing upon it. But it must not be forgotten that the major part of this young wood consists merely of suckers, which, though useful as props for mining purposes, never could make fine timber; moreover, the timber which these did produce could be only second-rate in quality. If we require strong and healthy stocks for grafting, we have to raise them from seed; in like manner, if we would have healthy and well-grown timber, we must raise the trees from seed also. Since, then, Nature of herself is unable to produce timber sufficiently fast to meet the requirements of a civilised and industrious people, it becomes the duty of the latter to assist her in her work, by planting the trees required in the most suitable positions and under the most favorable circumstances for their development. Hence the necessity for the due conservation of forests in all countries whose prosperity, in great part, depends upon a well-regulated timber supply.

A further duty of the department will be to publish at intervals, for distribution amongst our rural classes, all the reliable information it may possess upon the management and breeding of live stock, the cultivation of cereals, root crops, vines, tobacco, fibre-yielding plants, and all other agricultural products suitable to this country, noting in each instance the parts of the colony adapted to their culture. It should also furnish a report upon the nature and variety of soil, peculiarities of climate, average

rain-fall, and mean temperature of the different agricultural districts. The whole should be carefully compiled and printed in pamphlet form for distribution. Moreover, it should be the object of the secretary, whose work I presume it would be, to convey all knowledge to the reader in an intelligent yet practical and comprehensive style, and thereby to bring his writings within the grasp of the whole of our farming classes. A library will, therefore, form an important addition to the department, and I would suggest that, to assist the secretary in his work, the leading agricultural journals of England and other foreign countries be obtained ; more especially would I recommend to the department the journals of Germany and France, as these frequently contain sound information upon subjects of great practical importance in this country. In due course the inspectors of stock, and, in fact, every branch of the public service directly connected with agricultural pursuits, should be brought under the department ; but it will take a considerable time to mature plans for the transfer of these several branches, and it is useless, therefore, to contemplate doing the whole at one time.

The last, though by no means the least important duties of the department—indeed, I may say the most important duties—will be to consider how best to instruct the present occupants of the land in improved systems of farm management, and to devise the best means for educating the rising generation of farmers. In the fulfilment of the latter duty (the education of the youth) I apprehend no difficulty ; but it is otherwise with the former, and I confess it appears to me that it will prove a somewhat more complicated undertaking. Much has been said and written in favour of lectures. But this system of teaching adult farmers is, I fear, encircled by many obstacles. It is always a ticklish office to instruct men whose mode of thought is already established, but the more so when those whom you are desirous of teaching are men who, for the most part, have enjoyed only limited educational advantages. But it is still more difficult to procure a staff of men competent to lecture to practical farmers on subjects connected with their calling. Due allowance must always be made and conceded to the latter for having gained, from an extensive practical experience, some knowledge of the agricultural capabilities of the district in which they reside, and of the peculiarities of climate and the fluctuations in prices against which they have to contend. It would never do, therefore, to imagine that the department will be able, through the instrumentality of a staff of lecturers, to induce farmers to adopt a new or even a modified system of agriculture by rigidly pointing out the shortcomings of the course

they now pursue. I grant the end might be attained if only it were possible to secure lecturers possessing the necessary ability and discriminative tact; but the men who have the peculiar capacity for lecturing to practical farmers with a view to improve their position, at the same time without throwing a slur upon their present system of management, and thereby losing the confidence of their hearers, are so few that I fear it will be no easy matter to procure a sufficient staff in the colony. though I am well aware some competent persons do reside amongst us. I therefore would not uphold a plan for instructing the present occupants of the land by means of lectures unless I were personally acquainted with the men, and consequently able to judge of their fitness for the office. For my part, I would be disposed to place more faith in the distribution of carefully compiled information, and also of plants and seeds, as a means of instructing and assisting adult farmers. But I have already treated this subject at some length, and need not recapitulate in this place. There are, however, still other methods of teaching, which if adopted, I am inclined to believe would prove more immediately beneficial. One plan is by offering a prize for the best managed farm in each district. This system has been tried by the Royal Agricultural Society of England, and found to work satisfactorily; and it would doubtless meet the wants of this colony equally well. The class of men I refer to require to have absolute facts placed before them, and the more directly these can be made to bear upon their pecuniary interests the more conducive will they be of good. The farmers who farm best, that is, most profitably, will be regarded as men from whom others may take an example; besides, the system will inspirit rivalry in farm management, and tend to make every man compete with his neighbour for supremacy. The improvement of live stock, the production of sound wines, &c., might also be similarly encouraged; and I believe these last-named methods would be found better suited to raise the standard of farm management in this country than if lectures were resorted to as a means for instructing adult farmers.

With regard to the education of the rising generation of farmers, I am of opinion that no time should be wasted in deliberating on the matter; at the same time I am perfectly aware that the subject is one of too vast a magnitude to occupy the first attention of the new department. Nevertheless, the project should not be unnecessarily deferred, for it will require to be started in a humble manner, and gradually developed as circumstances demand. Concerning the organization of the proposed scheme, which should be set on foot at as early a date as is consistent with a properly matured plan of procedure, I would beg to

tender a few suggestions. In the first place, I would recommend that the Government grant a portion of land for the purpose. And here I may at once remark that I consider the model farm, in the Royal Park, unsuitable, and for reasons which I will endeavour to explain. Firstly—The farm is not extensive enough; for though it contains an ample area for purposes of a strictly experimental nature, still it is not large enough to afford students an opportunity of seeing farming carried on in as comprehensive a manner as the requirements of agriculture in this country demand. I may add that the aspect (south-west) is also an objection. And, secondly, the farm is situated too near to Melbourne. This more especially would be found to be the case if an agricultural college were to be established there, for among the greatest drawbacks to students engaging themselves in practical farm work are the proximity and attractions of a large town. Indeed, it is not by lectures alone that agricultural students can acquire a knowledge of their profession; they must also spend a portion of their time in practical work upon the farm, and I need hardly add that whatever tends to detract from this is prejudicial to the interests of the institution. When, therefore, it may be deemed expedient to found an agricultural college, I would suggest that it be situated in a suitable agricultural district, and at some distance from a township. A block of land, comprising not less than from 8,000 to 10,000 acres of forest and agricultural country, should be reserved for the purpose, and given as an endowment to a future college of agriculture. The ground should be selected with due reference to the wants of the institution, and should embrace not only forest and agricultural country, including grazing with arable land, but also a piece of ground permitting the illustration of the advantages derived from irrigation, a subject of no mean importance in this country. Assuming the land to have been granted, I will pass on to consider the course which should be adopted in the realization of the scheme. As I have already mentioned, the undertaking will have to be commenced in a small way, and the Government will have probably to be contented in the first year with a limited, perhaps even small, number of students. But this will be better than too rapid progress in the outset; and I entertain no doubt as to the ultimate success of the institution. I may remark that, after the Württemberg Department of Agriculture had been established, the necessity for founding a college of rural industries in connection with it soon became apparent. The estate known as Denkendorf, containing an area of only 200 Württemberg morgen, or about 257 English acres, was granted by the Government for the purpose. But it soon proved too small for the experiments which it

had been proposed to take in hand, and altogether too restricted to meet the requirements of an agricultural college. It was, therefore, decided to remove the institution to Hohenheim, the good King Wilhelm having placed his country palace, with the adjoining lands known by that name, at the disposal of his people. At that time, however, the whole of the estate, excepting the portion immediately surrounding the palace, and known as the Karlshof, was rented to farmers, who held it on lease up to the year 1822. By this means, the palace with the above-mentioned portion of land, containing only 329 Württemberg morgen, or about 422 English acres, was the whole immediately available for the new institution. Nevertheless, the celebrated agriculturist Schwerz having been appointed to the directorship, with a competent staff of professors under his control, it was determined to set the scheme in motion. Thus, in the early part of this century, and under the conditions above referred to, had its origin the Agricultural and Forest Academy of Hohenheim, now amongst the most prominent, if not the leading institution of its kind in Europe. But during the first year of its existence the number of students did not exceed eight. Still this state of things was not suffered long to continue ; for as the institution grew in importance, so also did it increase in magnitude, both as regards the number of its students and the extent of land, which, piece by piece, was apportioned and added to its estate, until at the present day we witness the college, enriched by a property comprising upwards of 16,000 acres of forest and agricultural country, holding its own amongst the leading institutions of its kind. Somewhat in the same manner will have to be started and gradually developed an agricultural college in Victoria. But let us view the subject more closely ; let us consider the internal management of the establishment, the proportions which it will be likely to assume, and the advantages of such an institution to this country. Whilst still adhering to my previous statement, regarding the humble manner in which the college will have to be started, I wish to add that my axiom must not be too strictly enforced. It will be imperative in the commencement to place the institution upon a sound educational basis. To effect this, a staff of competent professors will have to be engaged, and upon their efficiency will hinge the subsequent success of the undertaking. I need, therefore, hardly add that, when the time arrives for founding this proposed college of agriculture and forestry, great judgment will have to be displayed in the selection of a body of men to fill the professorial chairs. The staff should consist of the following officers :—A professor of agriculture, and jointly director of the institution, with an assistant or sub-professor, having the care of the entire farm under his

(the director's) orders ; a professor of forestry, having the management of the adjoined forests ; a professor of mathematics and natural philosophy ; a professor of chemistry, and jointly director of the chemical laboratory ; one of geology and botany, having the control of the botanic-garden ; one of veterinary science ; and, lastly, one of drawing. This will be found an ample staff to commence with, but as the college grows in importance, and the students increase in number, so will the staff require to be enlarged. The course of study for both agricultural and forest students should be not less than two years, at the end of which time a diploma or certificate of competency should be awarded to those who pass a satisfactory examination in the subjects specified. A distinction should be made between the agricultural and forests students; for though they might, and probably would, attend certain lectures in common, still each would be striving to attain a different end, and this should have recognition not alone in the studies pursued, but also in the constitution of the diploma awarded. The agricultural student, after completing the prescribed course, will probably commence farming on his own account, or otherwise he will return to the farm and home of his parents to assist in the management of the same, and to inherit, it may be, his father's property. But the case of the forest student will be different, since the Government will reserve the entire control of the forest lands. A still further hope, then, should be held out to those who devote their time and attention specially to forestry. Students who obtain a diploma or certificate of competency should be appointed, as vacancies occur, to the lower grades in the Department of State Forests. By this means, emulation would be encouraged, and the Government would secure officers thoroughly trained and duly qualified to superintend the work of conservation and forest management. The instruction imparted to all students should be rendered as practical as possible, and nothing should be taught in the lecture-room which would not permit of demonstration in the laboratory, the field, or the veterinary hospital. The lectures on each subject should be made of as special a character as circumstances would allow, and prominence should be always given to those matters which have a direct practical bearing upon agriculture, forestry, or the more common arts and manufactures. For example, in the lectures on geology particular stress should be laid upon the nature of the soils formed by the disintegration or decomposition of the several varieties of rock, as also upon strata yielding substances of economic importance. Again, in botany special attention should be directed towards plants suitable for culture in this country, as well as towards plants having medicinal or other properties, yet

incapable of coming to maturity under our climate. Indeed, it should be the aim of the director and professors of such an establishment to ground the students in the principles of the natural sciences connected with agricultural pursuits, and to impart to them the utmost amount of sound practice, based upon truly scientific principles. The education and other fees should be made as reasonable as possible, that the institution might be placed within the reach of the whole of our farming population. And, lastly, the college should be governed by a council, presided over by the Minister of Agriculture. But the management should be left to the director, who should superintend and control every department of the college, and be held responsible to the council, the latter body interfering only when the management does not meet with their approval. Concerning the proportions which the institution will be likely to assume, I may mention in the outset that I entertain no doubt as to its ultimate success, provided it be skilfully handled in the early stages. Agricultural science, in its widest scope, embraces a vast range of subjects. The natural sciences of chemistry, geology, botany, meteorology, zoology, physics, mechanics, physiology, and veterinary, are most intimately related to it. Agriculture includes, in fact, something of nearly every branch of human learning. Thus will it be readily understood that not every student who enters an agricultural college does so with the intent of pursuing farming hereafter as a means of support. Indeed I can speak from experience, having known many instances in point. It not unfrequently happens that a student, having been much interested in the lectures on geology, will resolve henceforth to make that science his chief study ; a second may set his mind upon chemistry, and determine to follow it ; while a third, feeling interested in mechanics and applied mathematics, may decide to become a mechanical, or, perhaps, civil engineer. It follows, then, that, with slight modifications, an agricultural college might be made to serve many purposes, and I can perceive no reason why this should not be carried into effect. Indeed, it has often occurred to me that, under good management, an institution of this description might be adapted to the requirements not alone of farmers and foresters, but also of mechanical engineers and members of still other industrial branches ; moreover, in a young country like this, where a practical acquaintance with scientific subjects is so highly esteemed and meets with such prompt recognition, the college might be developed, and without much difficulty, into a university for the teaching of applied sciences, thereby making the branches of agriculture and forestry only integral parts of the whole. Further, schools might be established having the same connection with

it that King's College School has with King's College, London. The teaching of dead languages in these schools should be superseded by instruction in German, French, and any other modern languages which the authorities might deem necessary. As the kindred institution of Hohenheim has risen from the grade of a school to that of an academy, so also might an agricultural college in this country be developed into a university which would embrace every branch of scientific training. The advantages of such an establishment to the country will be manifold. By securing the due conservation of our forests, and this at the hands of thoroughly qualified officers, together with a proper utilization of the timber, the community, as a whole, will be benefited more or less. Further, by raising the standard of our farming population intellectually, our soil will be rendered more productive. And lastly, though not least, by imparting a knowledge of applied sciences to a number of our youth, who will afterwards be scattered throughout the length and breadth of the colony, it will be the means of establishing new industries in our midst, besides causing local ones to be developed which otherwise might have long lain latent.

I will add a few words upon the subject of agricultural experiment stations, concerning which we have heard so much of late. In my opinion, the colony is not yet ripe for establishments of this description. At the same time, I am well acquainted with the services which such institutions render to the cause of agricultural science ; and I think, therefore, it will be a wise precaution to reserve a piece of land for this purpose in three or four districts of the colony—one in Gippsland, one on the Murray, one in the Western district, and perhaps one, also, in the metropolitan district. These, to my mind, will be sufficient. The scientific workers at each station will, as a matter of course, be engaged in the investigation of agricultural subjects ; for example, the analysis of soils and manures, the efficacy of artificial fertilisers, the growth of plants newly introduced, &c. ; and, by way of disseminating such knowledge as widely as possible, I would recommend that a district agricultural school be founded at each experimental establishment, which should be subject to, and managed from, the central college, on the same principle as the model farms of Ireland at the present day are governed from the central institution at Glasnevin.

Its Management.

There is a saying that "All great things have had small beginnings," and this is true, not only of many branches of manufacture, but also of departments of agriculture. The Minister of Agriculture is, therefore,

justly entitled to the thanks of the farming community for the judgment he has displayed in determining to start the department in a small way, and to allow it to develop as circumstances may require. It can be demonstrated that want of success is generally due to undertakings having been commenced in a too extensive manner, or to other injudicious treatment in the early stages, and, unfortunately, we have witnessed many such failures in this country ; but I refrain from naming any individual instance. To begin the new department, it will be necessary to procure a competent man to fill the office of secretary ; and he will require to have placed at his service one, or perhaps two, efficient clerks. With the above staff, the department will be able to commence its labours, but as its duties increase so will its staff require to be augmented. The secretary should be the permanent head, and be vested with authority to superintend and control every branch of the department, subject, of course, to the sanction of the Minister, to whom all matters should be submitted for signature before any definite step be taken ; and the secretary, thereby securing the confidence and support of his representative, would enjoy the best guarantee to stimulate and encourage him in his work. In regulating the progress and development of the department considerable judgment will have to be exercised, for nothing should be taken in hand without its advantages and disadvantages having been first carefully weighed one against the other ; for, be it remembered, the secret of success lies in gradual, yet sure advancement. The one obstacle to be avoided is a backward movement, for when such is experienced there is no telling at what stage matters may be re-adjusted. It has been advanced that, to meet the wants of agriculture in this country, we require to found a department after the model of the same department in the United States of America. But I beg leave to tender my dissent from the above proposition, as I do not believe it possible to obtain what will be applicable in our case by copying *in toto* the measures adopted in America, or any one other country. However, I do not for one moment question the efficiency of the United States Department of Agriculture ; indeed, I know it to be a well organized and competently conducted institution, but, like others of its kind, it has its shortcomings. We may gather from America many useful hints upon the formation and management of a department, but it will not serve our purpose to follow too closely in her wake. However, should it be necessary for us to imitate any one country, which I question, we will do well to investigate minutely the systems now practised in the different states of Germany, for to these chiefly does America owe her success in this direction. In a previous part of this

paper I have given a brief sketch of the foundation and gradual rise of the Agricultural Academy of Hohenheim, and I might here review, in equally few words, the steady development of the Department of Agriculture in the kingdom of Württemberg ; but there can be scarcely a necessity for my going so much into detail ; and I will, therefore, be satisfied to remark that, owing to the beneficial influence of the department of that country, the average yield of wheat has reached the high figure of nearly 40 bushels to the statute acre. I maintain that with a man at the head of the new department possessing a knowledge of the organization and management of kindred institutions, and having a competent and sufficient staff at his control, a system will be established in our midst which will prove better adapted to our wants than were we to rely mainly upon the example set by other countries. But I wish to make one proviso. When the time arrives for founding a college of agriculture, it will be advisable to send an officer to Europe to inspect and report upon similar institutions in Great Britain and on the Continent, for I consider much good will accrue from such an examination, and that it is essential, before founding an institution of the kind, to possess the most recent information on the subject. We do not omit to plant an acorn because it requires many years to become an oak ; in like manner, we should not neglect to establish a Department of Agriculture because it may take some years of careful administration to bring it into thorough working order ; nay, the interests of the State demand that this should be done.

ŒKONOM.

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REPORT OF THE INSPECTOR-GENERAL

OF

PARKS, GARDENS, & RESERVES.

GARDENS AND PARKS.

REPORT OF THE INSPECTOR-GENERAL OF GARDENS, PARKS, AND RESERVES.

TO THE HON. JAMES JOSEPH CASEY, M.P., MINISTER OF LANDS AND AGRICULTURE.

I have the honor to submit to you, in accordance with your instructions, the following report on the works executed, or in progress, in the gardens, parks, and reserves under my general supervision since 1st July last.

Botanical Garden.

In the Botanical Garden large portions of the borders have been turned up, and action taken to improve the future floral display therein, by the clearing away of worn-out or unsightly vegetation, the re-distribution of flowering shrubs, and the sowing of seeds of such annuals as will produce during spring and summer bright and pleasing contrasts of color. The aviaries near the bridge have been removed, and in lieu thereof a continuous fern-tree gully has been created, in which, amidst rockwork, have been planted Australian and New Zealand ferns, palms, Dracænas, &c.

The Curator of the Botanical Garden and the Government House Domain, Mr. Guilfoyle, has removed from the large conservatory to the open ground the large palms, the fronds of which had been damaged by pressure against the roof; he has re-potted a large number of the plants in the various conservatories, and has erected in the large conservatory a circular stage for the display of the most ornamental specimens of those plants.

The necessary action for multiplying the most useful and beautiful plants in the garden has been energetically carried out; and the labelling of plants has, generally, received attention. Nearly two hundred species of ferns have been found either suffering from want of

light under the stages in the smaller conservatories, or scattered among the sheds about the grounds. These ferns have been re-potted and re-labelled by Mr. Guilfoyle, and placed together in one of the propagating houses, wherein they can be conveniently inspected by persons who take an interest in ferns.

Many valuable trees and shrubs in the garden have suffered detriment, either owing to the unsuitable soil in which they were planted, or to imperfect drainage ; good soil is therefore now being carted thereto, and a portion of the vote for works to be executed under contract will be devoted to the systematic drainage of the garden.

Government House Domain.

In the Government House Domain the forming and planting of the footways of the South Yarra drive have been completed, with the exception of a short portion thereof near the junction of the drive with the Brighton road.

Rhododendrons and other plants have been placed in the American garden, which has been also temporarily enclosed with iron fencing, removed thereto from other parts of the Domain where it was no longer required.

The gardener's cottage has been taken away from the old quarry, which has been converted into a fernery by transporting thereto large quantities of soil, and stones for rockwork, and then planting in the transported soil Australian and New Zealand fern trees and other vegetation in keeping therewith ; for the shelter of which Agonis flexuosa, Platanus orientalis, Pittosporum, &c., have been transplanted on the sides of the quarry.

The intended fern-tree gully below the American garden has been drained with fragments of schist rock, and some fern trees planted along its course.

A large number of trees have been moved to different parts of the Domain, and small plants transferred thereto from pots.

The site for the orchard attached to the new Government House has been thoroughly trenched, drained, and planted with nearly three hundred fruit trees of the most choice kinds. A great quantity of manure has been brought into the Domain during July and August, and stored for future use.

Sections have been made with a view to inviting tenders for the forming, metalling, and gravelling of the carriage-way of the South Yarra drive, and the metalling, gravelling, and draining of the private

drive to the new Government House. I have been compelled to introduce in the section of the carriage-way of the South Yarra drive somewhat frequent changes of gradient, in order to obviate the necessity of making material alterations in the levels of the already formed and planted footpaths along the drive. In one part of the drive some alteration of the levels of the footpaths is unavoidable, as the heights thereof for several chains represent a dead level. The completion of the metalling, gravelling, and draining of these drives is contingent on the voting of the sum of £1000 entered for such purposes in the departmental supplementary estimates recently submitted to the Honorable the Treasurer.

I have taken action, in conjunction with Mr. Merrett, of the Public Works Department, for obtaining the necessary sections and drawings for the erection, near site of the old engine in the Domain, of a large new engine of 20-horse power, and pumps, for raising water for the irrigation of the Botanical Garden and Domain and supply of fountains therein, and also for conveying water into the Albert Park Lagoon. It is proposed that the water for the latter purpose be raised by a centrifugal pump connected with the engine, and be then conducted into the lagoon by large glazed pipes laid on a slight and continuous descent. The water for the Botanical Garden and Domain will be raised into a tank to be constructed on the highest ground therein, near Anderson street, South Yarra.

Having been instructed by you to report on the work done in the reserves since 1st July, and not on the work proposed to be done therein, I trust I may be excused if I here introduce a few remarks on some portions of the future work to be done in the Botanical Garden and Domain.

In the Botanical Garden, the Curator, whilst carefully fostering the growth of all rare and valuable plants therein, and bringing them prominently under the notice of the public by such descriptive labelling as I recommended in my previous report, and by the preparation of a compendious guide thereto, illustrated by a chart of the garden, should also, as soon as possible, show a good example of high class floriculture in the garden. In order so to do, its drainage must be improved, and such judicious application of virgin soil, &c., made to different parts of the ground as would render floriculture in the Botanical Garden more satisfactory than heretofore. In the Domain floriculture might then be restricted to the American garden and the proposed parterres near the new Government House.

As His Excellency the Governor desires that the croquet ground should be close to the house, the plateau on which it stands should be

enclosed by handsome balustrading, within which the floral parterres should occupy less space than in Mr. Sayce's design, so as to admit of the formation of a croquet ground on the portion of the plateau bounded on the north-west and south-west by the building. Such croquet ground should be bordered by the finest kinds of camellias procurable. The orangery would be in the position denoted on Mr. Sayce's design.

The ground north-west of the house should be soon cut down, in order to create a gently sloping well-grassed lawn, on the sides of which should be a few clumps of carefully selected trees. The two fern-tree gullies should be extended, an adequate number of walks formed and gravelled, and a large fountain erected in such a position as to be in keeping with the building.

Owing partly to the delay in completing the contract for the excavations and embankments in the swamp in the Domain eastward of Prince's Bridge, and partly to the reference by you to a Board of Engineers of some questions appertaining to the probable effects of such embankments on floods, no new plantations have been made on this part of the Domain. Not having been directly or indirectly connected with or cognisant of Mr. O'Connor's drawings and specifications for the excavations and embankments alluded to, or his supervision of the contract for such works, until some months after the works had been carried on by the contractors, it is obvious that, in my capacity as a member of the Board of Engineers in question, my opinion relative to the effects of such works on floods would be uninfluenced by any foregone conclusions. I have already, in reply to your questions, stated that, in my opinion, any detrimental effect of the embankment on floods could be prevented without making such very extensive alterations as have been suggested by my colleagues on the Board of Engineers, and which alterations would render the portion of the embankment left standing an unsightly and worse than useless encumbrance.

I think that so much of the embankment from its junction with the St. Kilda road eastward should be taken down as would afford as much escape for flood water, when very nearly as high as the top of the embankment, as could pass over the low part of the St. Kilda road; that instead of the very extensive lowering of the eastern portion of the embankment, as suggested by the Board, only a slight lowering for a short distance be made in such portion of the embankment, in order to allow flood water to commence to flow into the lagoon over such slight depression before the flood rose to the level of the embankment, and to thereby render the level of the water in the eastern part of the lagoon as high as the top of the embankment when the flood commenced to

flow over the embankment. This proposed slight depression in the embankment would have to be pitched in a similar manner to a bye-wash. Too many islands have been made in the intended lagoon, and the slopes of the embankment and islands are so steep as to be liable to much abrasion, and to consequently render the water of the lagoon turbid, and its margin dangerous for young children. One or two of the islands should be cut down, and the earth so obtained used for forming gentle slopes to the embankment and remaining islands. The construction of a river-side drive through the Domain and Botanical Garden to Anderson street should remain in abeyance until the completion of the river improvements suggested by the Royal Commission on Low-lying Lands.

Mr. Guilfoyle submitted on 14th August a report on the Botanical Garden and Domain, which report is appended hereto, and contains his opinions and suggestions with regard to the improvement of those reserves. I concur in a large proportion of his suggestions, but I do not advise the carrying out of the alteration proposed by him in the private drive formed by Mr. Sayce, as the cost of such alteration would be incommensurate with the advantage to be derived from it. During Mr. Guilfoyle's probationary service as Curator of the Botanical Garden and Domain, he has displayed a fair knowledge of botany, practical acquaintance with horticulture in all its branches, taste in laying out ground, and business habits in keeping accounts connected with the expenditure of votes for the Botanical Garden and Domain.

Carlton Garden.

The work in Carlton Garden since 1st July has been as follows:—

First.—The substitution for the original winding unformed path across the garden, between Queensberry street and Gertrude street, of a more direct path, the levels of which have been adjusted to conform to the surface drainage of adjacent ground and intersecting paths. This new path has been substantially constructed with bluestone metal and gravel, so as to effectually withstand the heavy pedestrian traffic to which it will be subjected.

Second.—The trenching, manuring, thoroughly draining, and top-dressing with fine loam, of the ground abutting on the new path; and the planting of such ground with large trees of choice kinds, flowering shrubs, and bedding flowers disposed in groups and ribbons.

The removal from plots of ground trenched before 1st July of a large number of unhealthy or unsightly trees; the planting in such

plots of Wellingtonia gigantea, Sequoia sempervirens, Ficus macrophylla, Quercus rubra, and other good kinds of evergreen and deciduous trees; the dressing of the borders of these plots with fine loam, and the planting in such borders of numerous groups of flowering shrubs, roses, and bedding flowers, so arranged as to avoid discordant contrasts of color; and the sowing of grass seed over the portion of the plots not taken up by the trees, shrubs, and flowers.

Fourth.—The trenching, manuring, draining, and top-dressing of some new plots of ground, and the planting therein of some large trees, shrubs, fern trees, Dracæna, Pampas grass, and flowers. In connection with these plantations in Carlton Garden there have been moved thereto from Fitzroy Garden and the Treasury Garden some large Ficus macrophylla, Cupressus California, Melia Azederach, Quercus coccinea, and other trees; also some Pampas grass, about two hundred flowering shrubs, and many bedding plants; and from the Botanical Garden have been obtained for Carlton Garden some Palms, Pittosporum crassifolium, Acacias, and a large number of potted plants.

Fifth.—Some ground has been trenched and drained (but not yet top-dressed or planted) for the purpose of obtaining by such trenching the gravel which occurs in thin strata in such ground, and then using such gravel for path-making.

Sixth.—The cedars which were close to the margin of the water of the fountain have been removed to other parts of Carlton Garden, and, in lieu thereof, fern trees, Australian fan-palms (Corypha Australis), Rhododendrons, &c., have been placed around the fountain, the artificial appearance of which has been somewhat lessened by the removal of the two unsightly conical piles of stones in its basin, and the placing on its upper ledge of some boulders of basalt to retain soil in which have been planted arum, and such creepers as would grow in such a position. The jets of the fountain have been modified so as to reduce their discharge to a minimum, and to the form of fine spray.

Seventh.—The erection of five pedestals for statues, and the placing on one of them of the large statue of the "Amazon." The Trustees of the Public Library have kindly granted my request to be allowed to take a replica of the fine statue of "Venus Dione," in the Library, for one of the pedestals in Carlton Garden.

Eighth.—The erection of a large number of iron hurdles along the boundaries of the improved plots of ground. I may here mention that I have entered into a satisfactory contract for the repair of all damaged hurdles in Carlton Garden, and the supply of new ones.

Ninth.—The erection by contract of new entrance gates facing Queensberry street and Gertrude street is now in progress, and will be completed in the course of a few days. The very old and broken fence around Carlton Garden is being patched up, so as to enable it to last for another year, and notice boards are being made for display of the regulations made by the Board of Land and Works under the 108th section of *The Land Act*, for the care, protection, and management of Carlton Garden.

Yarra Park.

In the Yarra Park, since the 1st of July, a very great number of large evergreen and deciduous trees have been moved into the thirteen picketed enclosures, wherein ground has been trenched, drained, and fertilized for their reception. Among the trees so moved to Yarra Park out of the Fitzroy and Treasury Gardens are large Araucaria excelsa (of which several are eighteen feet high), and large Araucaria Cooki, Araucaria Cunninghami, Araucaria Bidwilli, Wellingtonia gigantea, various kinds of Cupressus, Pinus insignis, Pinus ponderosa, Grevillea robusta, Cedrus deodara, Ficus macrophylla, Quercus coccinea, Betula, Platanus orientalis, Quercus robur, Ulmus vegeta, Populus alba, Populus monilifera, &c. As the diagonal path recently formed across the Yarra Park to Punt road, near the railway crossing, traversed sloping ground containing an extensive bed of gravel, such gravel has been utilized in forming roads and paths in the park; and over ten thousand loads of fertile loam have been brought on to the ground from whence the gravel was taken, and a very large and varied assortment of trees planted therein.

In the open part of the park, outside of the plantation enclosures, groups of different kinds of Western Australian eucalyptus have been planted in such positions as not to interfere with those portions of the park habitually resorted to for cricket and football.

The works in progress in Carlton Garden and in the Yarra Park have been placed by me under the immediate supervision of Mr. Bickford, the Park Overseer and Inspector of Bailiffs in the Melbourne District. I have much pleasure in bearing testimony to the zealous, intelligent, and faithful manner in which he has carried out my instructions relative to such works. His ready comprehension of such engineering details as I have from time to time imparted to him relative to the setting out and measuring up of various works, his attention to the transplanting of large trees, and his aptitude for managing large gangs of men, render his services more valuable in large reserves (the improvement of which

involves extensive surface alterations, road-making, draining, and arboreal planting) than would be the services of a trained professional gardener not possessing the special qualifications alluded to; the more especially as I have now some good working gardeners and plantsmen in the reserves. Mr. Bickford devised a very inexpensive and efficient apparatus, to be used in conjunction with ordinary drays or lorries, for lifting into them tall trees with large balls of earth at their roots; and such apparatus has enabled a couple of men to raise steadily and easily large trees, having at their roots balls of earth weighing from a ton to a ton and a half.

Fitzroy Garden.

In Fitzroy Garden the work performed since 1st July has comprised that connected with the ordinary maintenance thereof, such as the renewal of gravel on a portion of the walks, repairs to water channels and drains; renewal, by introduction of virgin soil, of the fertility of those flower beds which, by long continued floral display, had shown signs of exhaustion; replacement of worn-out bedding plants by new plants; repairing and re-painting the statuary; the partial clearing away of such trees and shrubs as have acted as nurses for protection of the more valuable trees during their young growth; and the general keeping in order of the garden. Around the new rotunda, ground has been specially prepared for reception of Palms, several kinds of which, including a very large specimen of the date palm, have been placed therein. In the central part of the garden have also been planted various choice shrubs, including Camellia, Thumbergia Hantagni, Lasiandra macrantha, Jochroma, Daphne Indica rubra, Rhododendron, Azalea, Berberis Darwini, Ceanothus Veitchianus, Boronia, &c.

The fern ground on west side of the gully has been extended, and additions have been made to the number of Australian and New Zealand fern trees previously in the garden. Some specimens of Fagus Cunninghami, dwarf ferns, and Zamias, have also been placed therein.

Along part of one walk ground has been trenched, drained, and planted with Quercus rubra.

Treasury, Flagstaff Hill, and Parliament House Gardens.

In the Treasury Garden, Flagstaff Hill Garden, and Parliament House Garden, the work since 1st of July has comprised general maintenance, the freshening of old flower beds with black soil and fertilizers, renewal of bedding flowers, repairs of paths, and some trenching, draining, and planting.

Albert Park.

In the Albert Park the existing plantations of young trees have been kept clear of weeds, some new drains have been cut, and a new avenue has been made through the enclosure in the portion of the park north of the St. Kilda Railway Station.

Studley Park.

In the Studley Park no further extension has been made in the planting out therein of non-indigenous trees, as it has been deemed desirable that one of the metropolitan parks should continue to afford a fair representation of ordinary Australian forest land. The caretaker of this park has attended to the young non-indigenous trees in the two enclosures on the hill, and has kept in order the nursery, wherein are a large number of young conifers, &c.

Macedon Nursery.

With reference to the State Nursery at Macedon, I append a report thereon by the Superintendent thereof, Mr. Ferguson. I approve generally of the work now being carried out by him therein, especially the construction of efficient drains, which are indispensable to the success of the plantations in this nursery.

I have the honor to be, Sir,

Your most obedient servant,

(Signed) CLEMENT HODGKINSON,

Assistant Commissioner of Lands and Survey, and Inspector-General of Gardens, Parks, and Reserves.

17th September 1873.

MEMORANDUM BY THE SECRETARY FOR AGRICULTURE RELATIVE TO WORKS IN THE GOVERNMENT HOUSE DOMAIN PRIOR TO 1st JULY 1873, ETC.

Having been requested by you to write a brief historical sketch of the works in connection with the laying out of the Government House Domain Gardens, I beg to state that, on my accession to office, there were employed in that reserve the following men, viz., Mr. Homeyer, in the capacity of foreman; gardeners, Smith, Watters, Gulliver, Morrison, Bourke, Moran, French, Lumsden, Hendrick; and engine-driver Soues, half time. Competitive designs had previously been invited, and of some twenty or more sent in three were ultimately selected as being the best. None of these, however, was considered up to the requisite standard. But as each contained some special merits the judges recommended (with a view to obtaining a design which should embody the good points of the three selected plans) that the successful competitors should be communicated with and a proposition made to divide the premium equally amongst them, on the understanding that the designs became the property of the Government. **In the meanwhile, however, Mr. Sayce, who had voluntarily prepared an elaborate design, offered to present it to the Government, and his design having been deemed superior to any of the competitive ones, and having been considered to approach more nearly to what was required, was lithographed, and subsequently submitted for the consideration of the Board.* Some of the members, however, pointed out to the meeting that although the design had been most carefully prepared, and the conception, as it appeared on paper, was unquestionably good, yet that it was likely the plan would not transfer well to the ground, and, moreover, that it would be most expensive to maintain. Mr. Sayce then, of his own accord, prepared an alternative and less elaborate design, which, together with the plan already referred to, was considered by the Board on Friday the 3rd January, the Board on this occasion having received valuable assistance in their deliberations from Mr. Charles Moore, the Director of the Sydney Botanical Garden, who

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* Note.—The portions in italic are in accordance with information supplied by the Assistant Commissioner of Lands and Survey, the circumstance having occurred prior to my taking office. A. R. W.

was at the time on a visit to this colony. At the meeting in question, the plan which Mr. Homeyer had been instructed to prepare was first dealt with; but after some examination it was set aside as inappropriate. Mr. Sayce's plans were then considered together, and the salient features of both having been duly compared, it was ultimately resolved that the more simple central ornamentation in the second plan should be adopted, that the river drives shown in the first should be continued to Anderson street through the Botanical Garden, as suggested by Mr. Moore, and that the return drive on the south-eastern side of the lakes should be also adopted. It was further resolved to extend the drive through the Domain to South Yarra, and to make an entrance near the late General Chute's residence for the accommodation of persons driving from St. Kilda. At the request of the meeting, Mr. Sayce consented to prepare a third design, embodying the selected features of his two previous ones, which design was ultimately adopted. A careful tracing, showing all the walks and the other leading features of the plan, was then made, and placed in Mr. Homeyer's hands, that no time might be lost in pegging out and defining the position of the main drives and walks. Mr. Homeyer, however, soon proved himself to be unequal to the task, and Mr. Smith was appointed to carry on the work under my general supervision. I continued to superintend the work until after your return from New Zealand, when I took occasion to point out to you that these duties absorbed more of my time than I could conveniently afford, and recommended that, until such time as a permanent curator should be appointed, Mr. Sayce be requested to undertake the supervision of the works, that he might satisfy himself that his design was properly transferred to the ground. Accordingly, Mr. Sayce was written to, and he consented to undertake the temporary supervision, and entered upon his duties on the 14th March. By this time, however, the principal drives and walks had been defined, and the borders of some had already been prepared for planting. Mr. Sayce concentrated his efforts on the main drive leading to Government House, and spared neither time nor expense to complete this to his own satisfaction. Means, however, soon began to run short. But on Mr. Sayce pointing out, in a special report, dated 15th April 1873, that it was necessary to push forward the work preliminary to planting, that the season might not be lost, and having estimated that, in order to maintain a sufficient staff of men to carry on the works up to the 30th June, and to provide for cartage, &c., an additional grant of £3950 would be necessary, the Honorable the Treasurer was applied to, and he consented to place £4000 at Mr. Sayce's disposal. The

necessary funds having been provided, Mr. Sayce was left untrammelled to appropriate them as he might deem best. I may add, however, that £540 of the above-mentioned £4000 was taken to provide the pitching for the better protection against flood of a portion of the embankment in course of construction near to the River Yarra. When the estimates for the service of the financial year 1873-4 came under consideration, Mr. Sayce was requested to prepare a report setting forth what had been done, and what it was proposed to undertake during the coming financial year, and also to state in detail what amount of money would be required to carry out such works. This Mr. Sayce did, and for the preparation of his report I, at his own request, handed to him for his guidance, and also as a means of saving him much time, his previously prepared *special* report. Some time afterwards I requested Mr. Sayce to write up this second report to the 1st June, which he did do; and the report so altered has since been printed and published. Thus it will be seen that the printed report in reality is nothing else than his first special report so altered as to embrace the work which had been executed between the date of the first report being written and the date of the last alterations and additions being made prior to publication. About the middle of June Mr. Hodgkinson requested me to furnish him with a report of the work done in the Domain up to date. I referred the matter to Mr. Sayce, and requested him to supply the necessary information. He did so in a report dated 21st June, in which he referred to his last report, that is, to the one dated 1st June, for an account of the work done prior to that date. Mr. Sayce's report, bearing date 21st June, has not been printed; but his report, dated 1st June, which embodies all his reports prior to that date, has been, as previously stated, both printed and published.

A. R. WALLIS.
22/7/73.

I may add that when Mr. Sayce handed to me his draft estimates, detailing the expenditure which he deemed necessary for the service of the Government House Domain during the financial year 1873-4, he pointed out to me that he had left his salary a blank, and stated that he considered, if his services were to be retained, he was entitled to a rise in his pay. Not feeling disposed, however, myself to submit Mr. Sayce's application for increase of salary for your consideration, I requested him either to write to you or to see you personally on the subject. Acting on my suggestion, Mr. Sayce took an opportunity of

seeing you; and I afterwards understood from him that you had expressed your inability to make any definite reply to his request, without first bringing his application under the notice of your colleagues, which you had promised to do. Sometime afterwards, Mr. Sayce informed me that he had received a letter from you informing him that, having considered his application for increase of salary and brought it before your colleagues, you were unable to sanction the same. Subsequently, however, as I understand, Mr. Sayce withdrew his demand; but as he had only accepted the office of curator temporarily, and as it became necessary for the Government, under the new arrangements for the management of the metropolitan reserves, to make permanent arrangements for the supervision of the works in the Government House and Domain Gardens, a letter, I find, was written to Mr. Sayce, dated 12th June 1873, in which it was pointed out to him "that it had become necessary to make permanent arrangements from the fact of his having informed you that he did not consider his temporary acceptance of the office involved the retention by him of his office after 30th June instant, and from his having asked that his salary should be increased to £800 per annum, if the Government desired to retain his services after that date. Although compliance with that demand was declined, and the demand subsequently withdrawn, it remained incumbent on the Government to make arrangements for the permanent management of the Parks and Gardens." The above details, I trust, will sufficiently explain the circumstances connected with this matter.

A. R. WALLIS.
25/7/73.

The Hon. the Minister of Lands and Agriculture.

MONTHLY REPORT OF THE CURATOR OF THE BOTANICAL AND DOMAIN GARDENS.

TO CLEMENT HODGKINSON, ESQ., C.E., INSPECTOR-GENERAL OF GARDENS, PARKS, AND RESERVES.

SIR,

I have the honor herewith to submit to you my first Monthly Progress Report on the Botanical and Domain Gardens.

BOTANICAL GARDEN.

I must premise that the state of confusion in which I found this Garden—crowded with weeds (thus rendering it difficult to give to many of the beds a sightly appearance in so short a time)—was such as to necessitate a great amount of careful consideration in order to determine upon any systematic mode to adopt. My first step was to bring a number of dwarf shrubs—such as Gardenia, Myrtus, Justicia, Polygala, and Palms, &c., &c., into prominent positions from places in which they were entirely hidden by plants of larger growth ; for, in fact, landscape beauty seems to have been sacrificed to correct geographical classification. These plants, which were quite overshadowed by useless indigenous scrub (Acacia, Leptospermum, &c.), I have placed in situations which will harmonise with the general effect when the process of remodelling, necessarily a work of time, is completed. Many borders have been carefully dug, and herbaceous plants plentifully distributed throughout the grounds. Seeds of gay flowering plants have been sown in abundance, in order to bring about a maximum of floral effect during the spring time fast approaching.

I have spent much time in inspecting the grounds to ascertain the location of the plants more especially worthy of prominent notice. In this inspection (which was much lengthened by the absence of any catalogue to guide me) I was greatly surprised to find that one of the chief defects was an almost total absence, in some cases an entire one, of such flowering shrubs as Camellias, Azaleas, Rhododendrons, &c., &c., of which many hundreds of varieties are to be found in these colonies, and which every lover of flowers must admit are essential, not only to the creation of brilliant display of bloom, but also, particularly in the

Plan of the GOVERNMENT HOUSE AND DOMAIN GARDENS

Designed by Joseph Sayce Esq.; Caulfield.

Lithographed at the Department of Lands and Survey by Heard & Barnacy Melbourne April 16th 1873

Scale—132 feet to 1 inch

Photo-lithographed at the Department of Lands & Survey Melbourne, by J. Noone

case of Rhododendrons and Camellias, to pleasing variations of foliage. Not only are these absent, but I miss some scores of other ornamental flowering trees and shrubs suitable to this climate.

The following birds and animals have been removed to the Acclimatisation Society's grounds :—Monkeys (2), kangaroo rat, native companion, silver pheasant, pigeons (2), Indian pigeon, landrail, parrot. The emus were not removed, and one of them died on Thursday last. The bird cages, which presented an incongruous and dreary appearance on either side of the bridge, were taken down, and the formation of a fern-tree gully continued on both sides, by planting large specimens of Dicksonia Antarctica, Cyathea, and Alsophila, with others of smaller growth.

A quantity of stones, hitherto scattered in an unsightly manner about the grounds, were utilised in this spot, from whence a quantity of extraneous plants, including Arundo, Lonicera, Sambucus, &c. (of which there are many specimens in the garden), were removed.

I have made a careful examination of those plants in the Botanic Garden which may be considered rare, but I have included with them many which, although common, are of great economic value. Attached to this Report is an appendix giving a list of plants in the Botanical Garden which may be considered rare, or of commercial importance, including medicinal, &c.

Much time is lost in selecting, packing, directing, and forwarding plants from this garden to various institutions. This should not be the case while the working staff employed is so small. The entire energies of the workmen should be confined to rendering the garden what it ought to be.

The large number of 1275 plants were sent to various institutions, &c., during the month of July 1873.

Near the palmhouse upon the hill, as I stated in my Preliminary Report, would be the most suitable locality in which to erect all conservatories, as a great amount of time is employed, with but an indifferent result, by several of the staff having to care for the nurseries and small greenhouses which are scattered through the garden. From this palmhouse large specimens of palms—Caryota urens, Seaforthia elegans, &c.—20 feet in height, which had forced their way through the glass roof, have been removed into the grounds, where they are doing well. I have suggested that the place occupied by these and a number of other plants be filled by the erection of a circular stage, the column of which would support the roof, which within the last few months has fallen fully six inches, and if left as at present would soon give way altogether,

but if supported in the manner indicated would last for many years longer. A new side stage has been erected during the month, the house painted, and many other repairs effected. I have selected the site for the new Victoria house on this hill. It should, however, be an ornamental building, and not a cramped and unsightly design, such as that which has been submitted; since, if the plant is worthy of a separate building, it certainly should be a good one. The plan furnished was by no means adapted to the purpose. In the first place, the roof was too low, the top being only 7 feet from the ground. The walls were only 4 feet high; the width of building 17 feet 6 inches, which would be far too narrow. In the plan the old building is made a part of the new one; but the tank of the former will not admit of the development of more than two leaves of the plant. Many plants in the palmhouse are sufficiently hardy to be distributed throughout the grounds, and there are numbers of others absent which can be obtained in this colony, and which would, by their diversity of foliage and elegant bloom, add materially to the attractions of the house.

This part of the garden could be rendered one of the most picturesque portions of the grounds. Several walks in this part should be dispensed with (indeed there are far too many of them throughout the garden), and the whole space prettily laid out and suitably planted. The avenues of Grevillea robusta, Pinus insignis, upright Cypress, and Araucaria Bidwilli, should be taken up and distributed throughout the garden. The plants grown in these grounds should most decidedly be entirely reserved for the renovation and embellishment of the garden, which from its present state imperatively demands it. Stenotaphrum glabrum (Buffalo grass), which thrives remarkably well in this colony, I would extensively use for carpeting the lawns generally.

The soil of the garden is very poor in many places, and drainage seems to have been almost ignored. It matters not how rich the soil may be, the want of proper drainage will render any attempt at cultivation comparatively fruitless. In glancing over the immense amount of improvements and alterations which remain to be effected in the garden, it is a difficult matter to determine how to lay out to advantage the small sum (£400) which has been apportioned from the contract vote. To attempt the improvement of the lake, islands, and marginal surroundings with so small a sum would be useless; and as drainage ought to be a primary consideration in any garden, I am inclined to believe that it could not be expended to greater advantage than by forming a substantial groundwork of future improvements by commencing a thorough system of drainage.

During the month I have sent to New Zealand for ten Cyathea dealbata, ten Cyathea medularis, and ten Dicksonia squarrosa (tree ferns of great beauty); and to the Richmond River for Staghorn ferns (*Platycerum grande*). With these I intend to decorate the gullies in the Botanical and Domain Gardens.

From the curator of the Sydney Botanical Gardens (Mr. Charles Moore) I have received the addresses of the best firms in England and Ireland (Messrs. Weeks, King's Road, Chelsea, London; Mr. Gray, Chelsea, London; and Mr. Turner, Hammersmith Works, Dublin), to whom I have written for plans and specifications of conservatories manufactured by them. From Mr. Moore I have also received a copy of the Rules and Regulations in force in the Sydney Botanical Gardens. From the number of thefts which are continually committed in the garden, I think it advisable to adopt strict rules here for suppressing them. Lately a portion of a very choice Dracæna (D. Knoxi), discovered by myself several years ago in the South Sea Islands, was stolen from the large conservatory; and many herbaceous plants and flowers have also been stolen from the borders. The gates, under the present rules, are left open until nightfall; the gardeners leave at five o'clock, and the garden is almost entirely at the mercy of thieves after that hour. I would also suggest that three men should watch the garden on Sundays. From the Domain also six or seven of the trees newly planted along the St. Kilda road have been stolen.

Appendix.

PLANTS OF COMMERCIAL IMPORTANCE, ETC., IN BOTANICAL GARDEN.

Acrocomia sclerocarpa.
Aephanes corallina.
Areca alba.
„ catechu (medicinal).
„ concinna.
„ lutescens.
„ Nibanes.
„ obovata.
„ pumila.
„ rubra.
„ triandra.
Arenga saccharifera (sugar palm).
Aberia Caffra (Kai apple).
Acacia Arabica (gum arabic).
„ Farnesiana.
„ amara.
Acacia ferruginea.
„ Lebbeck.
„ speciosa.
Acer dasycarpon (silver maple).
„ palmatum.
Achras sapota (sapodilla plum).
Adesmia balsamica (scented balsam).
Aeschynomene aspera.
Æsculus Californica.
Alkanna tinctoria (dye plant).
Aloe arborescens.
„ ferox.
„ linguiformis.
„ plicatilis.
„ soccotrina.
Alnus Capensis (alder).

Alnus serrulata.
Alpinia nutans (starch).
Alstonia constricta.
Amomum masticatorium, „ pulchellum } (spice).
Argania sideroxylon (oil, argan tree)
Artocarpus integrifolius (jack fruit).
Artemisia Absinthium (wormwood).
„ argentium (Roman worm. wood).
„ Dracunculus (Tarragon).
Atropa Belladonna (deadly nightshade).
Averrhoa Carambola (fruit).
Baryosma serratifolia.
Betula fruticosa.
Bœhmeria nivea (grasscloth plant).
Broussonetia papyrifera (paper mulberry).
Bowenia spectabilis.
Borassus flabelliformis.
Bentinckia condapanna.
Calamus Roxburghi.
Caryota sobolifera.
„ urens (sago, sugar, fibre).
Chamerops excelsa.
„ Fortunei (matting).
„ humilis.
„ macrocarpa.
Cocosoleracea plumosa (vegetable).
Cycas cercinalis.
„ media.
„ revoluta (sago).
„ Rumphi.
Caladium esculentum.
Canna accira.
„ edulis (starch).
Capparis spinosa (caper).
Carya alba (shellbark hickory).
„ amara (bitter nut).
„ olivæformis.
„ porcina (pignut).
„ tomentosa (mocker nut).
„ microcarpa.
„ sulcata.
Caryophyllus aromaticus (clove tree).
Cedrela odorata.
„ Taona (cedar wood).
Cerasus ilicifolius (Californian cherry).
Cimicifuga racemosa (bugwort).
Cinchona Calisaya (yellow Peru bark)
„ micrantha (Huanuco bark)
„ officinalis (Crown Peru bark)
„ succirubra (red Peru bark)
} Quinine trees.
Cocculus palmatus.
Curcuma albiflora (tumeric).
„ cordata.
„ glaucophylla.
„ longa.
„ pestiolata.
Camelina sativa (oil).
Cantua pyrifolia.
Carthamnus tinctorius.
Caryota urens.
Ceratonia siliqua.
Chamœcyparis sphæroidea
Chelidonium majus.
Clitoria ternata.
Cheorum tricoccum.
Colchicum autumnale.
Cynara cardunculus.
„ scolymus.
Cyperus papyrus.
Dipsacus fullonum.
Dracocephalum Moldaicum.
„ Canariense.
Durio zebethinus (Durio fruit).
Dalbergia sissoo.
Dendrocalmus giganteus.
Dioscorea aculeata.
„ alata (yam).
Diospyros kaki (fruit).
„ mabola (fruit).
„ Virginica (fruit).
Dorema assafœtida.
Doryphora sassafras.
Elymus arenarius.
Erythroxylon cocoa.
Eugenia Braziliensis (Brazilian cherry)
„ Mitchelli (fruit).
Ficus elastica (indiarubber).
Fourcroyæ gigantea (fibre).
Fraxinus acuminata (ash).
„ floribunda.
„ lutea.
„ macrophylla.
„ sambucifolia.
Genista tinctoria.
Echolium agreste.
Echium vulgare.
Elæagnus angustifolius.
Erica arborea.
Erium Ervilia.
Eryngium bromelifolium.
Escallonia rubra.
Euterpe oleracea.
Ficus indica.
„ religiosa.
Francoa sonchifolia.
Glycyrrhiza echinata.
Glycyrrhiza glabra.
Guaicum officinale.
Guillaja saponaria.
Guizotia oleifera.

Galega officinalis.
Geum urbanum.
Glaucium luteum.
Gymnocladus Canadensis.
Hedysarum coronarium.
Hibiscus mutabilis.
Hæmatoxylon Campechianum (log-wood)
Helicia ternifolia.
Helleborus viridis.
Hymenæa Courbaril.
Hypericum perforatum.
Heracleum sprengelianum.
Hibiscus esculentus.
Hovenia dulcis (fruit).
Hyoscyamus niger (henbane).
Indigofera Anil (indigo plant).
Inga Saman.
Ilex cassine.
„ Paraguensis (Paraguay tea).
Isatis tinctoria (dyers' woad).
Jambosa vulgaris.
Jatropha curcas
„ glauca
„ manihot
„ multifida } starch plants.
Juglans cinerea (butternut).
„ nigra (black walnut).
Juniperus Bermudiana (pencil cedar).
Illicium floribundum.
Iris Germanica.
„ pseudacorus.
„ xiphium (dye).
Jubæa spectibilis (fruit).
Juniperus communis
„ oxycedrus } (medicinal).
„ thurifera (scented resin).
Lactuca virosa (medicinal).
Lappa major (Burdock, medicinal).
Lippia citriodora (scent).
Macleura aurantica (dye).
Laurus camphora (camphor).
„ cinnamomum (cinnamon tree).
„ Indica (Indian bay).
„ nobilis (sweet bay).
Liriodendron tulipifera (tulip tree).
Lygeum Sparteum (Esparto grass).
Kæmpferia rotunda (spice).
Madia sativa (oil).
Malva crispa (medicinal).
Mangifera Indica (mango fruit).
Marrubium vulgare (horehound).
Melilotus officinalis (medicinal).
Menyanthes trifoliata (bog bean, medicinal).
Maranta arundinacea (arrowroot).
Mandragora vernalis (medicinal, mandrake).
Melissa officinalis (balm).
Musa Cavendishi (Chinese banana).
„ paradisica (Indian banana).
„ textilis (Manilla fibre).
Origanum vulgare (medicinal).
Papaver somniferum (oil and opium).
Passiflora edulis (passion fruit).
Phœnix reclinata (date).
Phyllocladus trichomanoides (dye).
Physalis somnifera (medicinal).
„ Peruviana (fruit).
Myrtus Ugni (Chilian guava).
Nephelium Lichi (fruit).
Olea Europea (olive).
„ Belgentier (large fruit).
„ Bontignan.
„ Bonguellian.
„ Caillon or Bourgeon.
„ Cornichon.
„ Cyrus.
„ de Constantine.
„ de Malta.
„ de Nyons.
„ Vardel.
Owenia ceracifera (fruit).
Panax papyrifera (rice paper plant).
Pentzia vergata (fodder).
Persea gratissima (Avocado pear).
Pimento vulgaris (allspice).
Piper nigrum (black pepper).
Pistacia lentiscus (mastic tree).
Psidium anonafolium (guava fruit)
„ Cattleyanum (black guava)
„ littorale
„ pyriferum } Fruits.
Pistacia vera.
Porterium sanguisorba.
Prinos verticillata (dye and medicinal).
Prunus serotina (medicinal).
Punica granatum.
Quassia amara.
Quercus Americana (oaks).
„ ambigua.
„ cinerea.
„ cuneata.
„ falcata.
„ glauca.
„ Hindsi.
„ Lusitanica.
„ Mexicana.
„ Somonensis.
„ palustris.
„ serrata (silkworm oak).
„ Ægilops.
„ alba.
„ castanea.
„ glabra.
„ ilex.
Rhus glabra (dye).
„ typhina (medicinal).

Ruscus aculeatus (butcher's broom, medicinal).
Rhamnus utilis (tanning).
Rhus copallina (resin).
„ coriaria (sumach).
„ cotinus (dye).
„ radicans.
„ succedanum (wax plant).
Rottlera tinctoria (dye).
Rubia tinctorum (madder).
Saccharum officinarum (sugar cane).
Salix Hoffmanniana, „ Humboldti, „ Russelliana (Huntingdon willow) } (willows).
„ viminalis (common osier).
Santalum acuminatum, „ album } (sandalwood).
Sesbania aculeata (fibre).
Smilax aspera, „ sarsaparilla } (medicinal).
Spondias dulcis (fruit).
Stillingia sebifera (tallow).
Strychnos nux vomica (strychnine plant).
Swietenia mahogani (mahogany tree).
Tamarindus Indicus (tamarind fruit).
Tectonia grandis (teak tree).
Sedum telepheum (medicinal).
Sida pulchella, „ retusa } (fibre).
Solanum dulcamara (medicinal).
Stachys Germanica (medicinal).
Sinapis alba (white mustard).
Teucrium betonicum, „ morum } (medicinal).
Vitex agnus castus
Verbascum Thapsus (medicinal).
Vangueria edulis (fruit).
Vanilla aromatica (spice).
Valeriana officinalis (medicinal).
Villebrunnea appendiculata (fibre).
Vilfa tenacissima (paper material).

Vitis rotundifolia.
Zingiber officinale, „ ligulatum } (ginger).
Zizyphus Jujuba (fruit).
Yucca aloifolia, „ fillamentosa } (fibres).

Rare and beautiful Palms and Zamias.

Kentia Fosteriana
„ Mooreana
„ Sapida
Latania Borbonica
„ commersoni
„ glaucophylla
Livistonia altissima
„ Chinensis
„ humilis
„ maritima
„ olivæformis
„ rotundifolia
Macrozamia cylindrica
Oreodoxa regei
Oncosperma fasciculata
Phœnix dactylifera (date palm)
„ silvestris
„ spinosa
„ acaulis
„ pumila
„ reclinata
„ rupicola
Ptychosperma Alexandrae
„ rupicola.
Pritchardia Martei.
Rhapis flabelliformis.
Sabal Adansoni.
„ Palmetto.
„ umbraculifera.
Seaforthia elegans.
Wallichia caryotoides.
„ porphyracea.
Zamia Altersteni.
„ Lehmanni.
„ Denisoni.
„ Mignelli.
„ spiralis.

The Domain.

The following Report is up to August 10th instant :—

After a few days' delay, work recommenced in these grounds on the 4th July last, the permanent staff having been reduced by the transfer of 5 (five) gardeners to the Botanical Garden.

The principal works accomplished during the past month have been :— Forming a great portion of the footpaths of the South Yarra drive, and planting them with Planes and Ficus macrophylla ; filling up with soil and partly forming the American garden; planting a shrubbery at the

head of the private drive; planting a belt of trees along the St. Kilda road; and removing Pines, Cypresses, &c., to suitable positions in the park. Two large specimens of Abies have been transplanted from the orchard to the private lawn. The plantation of trees along the St. Kilda road has been dug, and a quantity of soil put down to back up the footpath. Here 200 pot plants of conifers have been planted, besides a number of Quercus lanata, and Pittosporum crassifolium.

The foothpaths of the South Yarra drive have occupied the principal portion of the labor and cartage during the past month. These footpaths have been completed as far as Millswyn street, South Yarra, and planted with Ficus macrophylla and Oriental planes. Of the former, 80 plants, varying from 3 feet to 10 feet in height, have been removed from parts of the Domain to this position. The planting of these has been rapidly proceeded with; between each Ficus in the back row there is an Oriental plane; but it is doubtful whether in such a locality the latter will ever become a fine tree. It would, however, be an easy matter to replace the back row of Planes with Ficus. And what can be more beautiful than the dense glossy evergreen foliage of the Moreton Bay fig? In its native home, Queensland, I have seen it towering to an altitude of more than 100 feet; and—contrary to assertions recently made—it is, when at maturity there, quite destitute of lateral branches, while its wealth of leafage affords a grateful shade.

There has been a great amount of unseen work upon these footpaths, they having not only to be properly levelled and prepared for traffic, but also to be trenched, manured &c., for the future growth of the avenue trees planted therein. The heaviest cutting and filling yet experienced during the progress of this work was from Millswyn street to the termination of these footpaths in Anderson street. If the weather permits, one footpath will be completed and planted within a week from this date, and the other in ten days from the completion of the first.

The line of fencing defining the private grounds has been measured off, and marked by a trench. Levels and measurements having been taken for the purpose of laying out the private grounds, the approaching completion of the South Yarra drive footpaths will render available a good supply of labor. If the present staff is continued, and the amount allotted for cartage also maintained, the whole of the private gardens (with the exception of the terrace) may be completed and planted during the present financial year. The terrace can be proceeded with, but cannot be completed until building operations have ceased. Operations have also been commenced in the private grounds by forming a fern-tree gully in the quarry, which has been excavated to the required depth.

On one side of this gully a rockery is in course of formation. A large quantity of stones, stumps, soil, &c., has been carted to the spot, and within a week the ferns will have been planted; but in order to concentrate as much force as possible on still more important work, such as the formation of the lawn and flower gardens, &c., I would suggest that the completion of the rockery had better stand over for a time. This work, however, will require a temporary protective fence. A large quantity of grown specimens of Pine and Cypress, occupying the site marked for the stables on the plan, are being transplanted to other parts of the Domain, with a view to future embellishment. This work, which is still progressing, is a heavy one, as many of the trees are of considerable size. Other large trees have been transplanted on the west side of the American garden. The collection of manure, &c., is continued by two carts and men constantly employed, and the success of planting operations mainly depends upon this important work. There being scattered about the Domain a number of ornamental trees—(such as Araucaria excelsa, Araucaria Bidwilli, Cedrus deodara, Cedrus Libani, Ficus macrophylla, Cupressus macrocarpa, Cupressus Lawsoniana, Pinus Benthamiana, Pinus insignis, Wellingtonia gigantea, and many other well grown specimens, varying in height from 5 feet to 10 feet)—these can be utilised during the present financial year in doing much towards the creation of varied and beautiful scenery throughout the Domain.

In measuring off the additional ground to be added to the 2¼ acres originally intended for the orchard, it was found that the available ground, instead of being one acre in extent, was but little more than one quarter of an acre. It was therefore necessary to add to the orchard the portion intended for a vegetable garden. A site for the latter has yet to be determined on. An orangery may appropriately be created on the spot selected in the plan. A contract has been let to Messrs. Taylor and Sangster for the formation of the orchard, which has been commenced, and has to be completed within one month. The soil is in many places inferior, and manure will have to be freely used. A selection of the best sorts of orange trees has been sent for from Sydney, and until the ground is ready for them they will be carefully preserved in pots or tubs in the Botanical Garden.

The American garden will have to be very carefully drained. The banks of the stream, formed according to the plan, will require to be turfed, as the chances are that, unless this is done, the steepness of the descent to the stream will cause in wet weather a continual removal of the soil to the valley below. During the month this part of the grounds has been filled with good soil; but, before the planting of Rhododen-

drons takes place, it will be necessary to fence it in. For this purpose a portion of the iron fencing in the Domain has been removed, in order to secure the ground temporarily until the private ground is permanently enclosed (which I would recommend be proceeded with at once). When this is completed, the Rhododendrons may be planted at any time. Fifty choice Rhododendrons are being carefully attended to in the Domain and Botanical Gardens' nurseries, until the ground of the American garden is prepared for their reception.

Assuming that Mr. Sayce's plan is to be adopted, I certainly am of opinion that some alteration should be made in the mode of planting the private drive. The trees have not only been badly arranged, but many of them are unsuitable for the position, such as Araucaria imbricata and Wellingtonia gigantea. In this climate these trees are slow of growth, and it will be many years before they will shut out the drive from the park. Contrast of foliage has not been studied, and the front row has been planted too close to the edge. This row should have been at least 18 feet further back, so as to admit of a choice selection of handsome shrubs of various heights in the foreground.

As at present planted, the trees—from the fact of their elevation—stand a great prospect of being destroyed during the ensuing summer season, when the scorching heat of the sun will render the mounds upon which they are planted so dry that the trees are not likely to exist long.

In my opinion a much more graceful curve should have been given to this drive, besides affording a far easier approach to the vice-regal residence. It should have been much wider, having a double entrance from the South Yarra drive, divided by a lodge, the latter being hidden from the inside by an appropriate piece of planting. I would have taken it more towards the Observatory with a well rounded sweep, crossing that space which on the plan is marked as a carriage stand, dispensing with the latter, and entering an expanse of gravel proportionate to the size of the building. One spacious terrace upon the eastern end of the house should be formed, and the hollow towards the American garden well filled up. This might very easily be accomplished by removing the top of the hill in close proximity, which, under any circumstances, will have to be done. The lawn would then have a gentle slope, and the terrace (which should be tastefully decorated with shrubs close to the edge) gradually diminish past the American garden. I may here remark that the lodge, drive, approaches—in fact all the adjuncts to Government House—should, according to the principles of true landscape, be in proportionate harmony with the size of that building. To narrow or dwarf the surroundings is simply to destroy

the whole effect; as, for instance, in the projected pony drive, of which I do not see the need. This should be a walk at least 21 feet wide. Its present dimensions have by contrast a mean appearance. It should commence at the private entrance to the Botanical Garden, curve gently round the hill, verge to the base of the terrace, and encircle the lawn (*see* attached plan), the margin of which should be tastefully ornamented with rich foliage, and well contrasted clumps of irregular shapes at proper distances. The sward itself should be sparingly planted.

The Buffalo grass, (Stenotaphrum glabrum) if planted in places upon the lawn and terrace, would soon carpet them with lively green; and it matters not how dry the summer season may prove, as this grass will withstand the most severe drought. Seeds of other grasses should be freely sown during the months of April and May. New ground such as this should be left fallow until the end of March.

The site chosen for the new Government House commands a charming view of the scenery around Melbourne for miles; and when the belts of trees now being planted at the lower end of the private ground are of sufficient height to shut out the heavier aspects of the distant city, giving, through the vistas formed by careful grouping, ever-varying scenery down to the lakes at Prince's Bridge, the picturesque effect will be greatly heightened. Though the soil is in some places but a mound of clay, this defect can be partly remedied by the cartage of suitable earth to such spots.

One of the greatest essentials in landscape gardening is the variety of foliage and disposal of trees. Nothing can excel the glimpses afforded by the openings between naturally formed clumps of trees and shrubs, whose height and contrast of foliage have been studied. At every step the visitor finds some new view—something fresh, lively, and striking, especially when tastefully arranged. Where long sombre rows of trees are planted, and a sameness of foliage exists, the very reverse is the case. Nature's most favorable aspects then seem sacrificed to art, and that art often produces but a chilling effect.

Appended is an amended plan, showing part of the alterations suggested in the above Report; also a series of sketches illustrative of improvements to be effected in grouping, &c.

I have the honor to be, Sir,
Your obedient servant,
WILLIAM R. GUILFOYLE,
Curator Domain and Botanic Gardens.

REPORT OF INSPECTOR OF STATE FORESTS.

TO CLEMENT HODGKINSON, ESQ., C.E., INSPECTOR-GENERAL OF GARDENS, PARKS, AND RESERVES.

In obedience to your request, I have the honor to furnish you with a brief report of the operation being carried out in this department.

Early in December last fencing and clearing were commenced in State nursery, Macedon; the portion selected for operation being the south side of the reservoir, with a gentle slope to the north-east, and running down to the edge of the water.

The soil consists of a sandy loam with a deep clay subsoil, friable when broken up, and being somewhat porous is well suited for the growth of young trees for forest planting; patches of deep alluvial soils are scattered over the whole area, and, owing to the undulating contours of the surface, various aspects are presented suited to trees from different countries.

The land at the time of commencing operations was thickly covered with stringy bark and gum saplings, and the immense number of large stumps studded over the whole area was evidence of its having been heavily timbered at some former period. The small amount of money voted for this department rendered it most expedient to study economy of labor, so as to be able to show some results at the end of the financial year; therefore my operations have been limited to a certain area, rather than attempting too much with such small means.

After grubbing and clearing about six acres, I employed powerful bullock teams to plough the land and a subsoiler to follow in the furrow and stir the soil to a uniform depth of from 16 to 18 inches. By this means the good soil was kept near the surface, and the poorer subsoil merely loosened up; at the same time, all surface roots broken or thrown up by the bullock plough were removed, and care was taken to keep the surface soil loose and as little trodden upon as possible. This work was performed during March, and, when required for planting in May, the land was friable and could be easily worked.

A small patch—about half an acre—was trenched by hand and all the roots carefully extracted. A portion of this was sown with seeds of Pinus insignis, Wellingtonia, and other forest trees, which have succeeded beyond my most sanguine expectations.

The season being favorable, about the beginning of May planting was commenced, and continued at every favorable opportunity.

I have had the ground intended for nursery stock measured into divisions, and subdivided into quarters of one chain in width by two chains in length ; each quarter is divided by a live fence to afford shelter—an important provision in all nurseries for young trees. These fences consist of several kinds of Pittosporum, Privet, Olive, Acmena, Cupressus of several species, Whitethorn mixed with a small proportion of evergreen Privet, and some other plants, and serve the purpose of wind breaks.

The main walks are 15 feet wide, and on each side at 33 feet apart are planted a row of Platanus orientalis for shelter and ornament. My principal object in having walks of this width is that a horse cart may be taken to any quarter of the nursery, for the purpose of loading nursery stock and for economically conveying soil or manure where required. The young trees are planted in nursery lines 3 feet asunder, for the convenience of cleaning and hoeing amongst during the summer. I would here remark that all the land being planted in this nursery is worked with long-pronged steel digging forks, which are much superior to spades, as they bring every particle of gum root to the surface, and mix the soil better ; in fact, they work the soil into proper condition for the reception of either seeds or plants.

About the end of June three acres of land in this reserve were prepared after this manner, and upwards of 10,000 plants of forest trees planted in nursery rows ; a large proportion of these will be ready to transplant next season.

Since the end of June nearly two acres more have been got ready and partly planted, and, should the weather permit, I expect to have in all five acres planted before the end of September.

In addition to the above labor, about 300 cubic yards of soil have been removed, by barrowing, to fill up gullies and broken ground near the cottage of the Superintendent. This was urgently required to prevent the soil being washed away by the heavy rains falling on the ranges, and which come with irresistible force down the gullies, in the winter season.

Drainage has not been overlooked, and, at the present time, is being vigorously pushed forward. During the past month (July) upwards of 116 rods of substantial rubble drains, averaging from two and a half to five feet deep, have been cut and well filled up ; about thirty rods remain to be completed before spring.

A strip of land ten feet in width has been subsoiled inside the boundary fence, on the south side, for about forty chains in length ; this will be planted with Whitethorn and a sprinkling of evergreen Privet as soon as the weather will permit ; at present it is too wet to plant.

A piece of rich soil in a well-sheltered situation is being prepared for the reception of seeds of forest trees, to be sown next month, or as soon as the season gets warmer in this locality.

As soon as the above work is completed I shall commence to grub and clear about seven acres more land to be in readiness for next season's planting.

The following is the list of young forest trees planted prior to 30th June 1873 :—

150	Abies Douglasii.
320	„ Fraserii.
12	„ Mertensiana.
12	„ Nordmanniana.
40	„ alba.
1,500	„ Webbiana.
200	„ balsamea.
150	„ Smithiana (Khatrow).
13	„ orientalis.
12	„ Menziesii.
45	Araucaria Cunninghamii.
20	„ Bidwillii.
1,500	Fraxinus excelsior (ash).
250	Cupressus glauca.
65	„ Goveniana.
57	„ Benthamii.
260	„ Lawsoniana.
170	„ torulosa.
1,375	„ macrocarpa.
10	Carya olivæformis.
1,428	Cedrus deodara.
250	Pinus contorta.
300	Pinus excelsa.
50	„ Monticolo.
20	„ Torreyana.
90	„ rigida.
120	„ pungens.
1,500	„ insignis.
223	„ ponderosa.
15	„ Gerardiana.
18	„ Strobus.
25	„ tuberculata.
36	„ Sabiniana,
25	Podocarpus ferruginous.
50	„ cupressiformis
100	Juglans regia.
50	Quercus serrata.
12	„ lusitanica.
10	„ macrocarpa.
10	„ Castanea.
80	„ lanata.
500	„ robur.
50	Taxodium sempervirens.
250	Wellingtonia gigantea.

Planted July 1873.

750	Abies Webbiana.
700	Ash.
150	Acer rubrum and Neapolitan.
50	Betula papyrifera.
100	Cupressus torulosa.
50	Larix Europæa and pendula.
100	Platanus orientalis.
600	Pinus rigida.
250	Pinus pinaster.
200	„ excelsa.
1,000	Quercus robur.
900	„ suber.
250	„ virens.
250	Willows.
100	Poplar (various).

Cuttings planted July and August.

1,500	Morus alba, rosea, multicaulis, &c.
1,500	Platanus orientalis.
750	„ occidentalis.
1,500	Populus alba.
1,000	Ulmus campestris.
300	„ suberosa.
3,000	Privet.
1,000	Willow.

5000 Pinus to plant.

I have the honor to be, Sir,
Your most obedient servant,
WILLIAM FERGUSON,
Inspector of State Forests.

21st August 1873.

By Authority: John Ferres, Government Printer, Melbourne.

Royal Botanic Gardens Victoria
RBG00021190

Elizabeth Campbell
Ataxian
July 1997
$95.00